

ADDITIONS AND CORRECTIONS TO USTILAGINALES

BY GEORGE LORENZO INGRAM ZUNDEL

More than thirty-two years have elapsed since the publication of the original text of this order in the present work. At the time of his death (13 August 1937), Dr. Clinton had accumulated many additions and corrections, and these have been utilized in the preparation of the following pages; but they were not in shape for publication, and this text has been prepared by the fellow-worker who was associated with him for many years in the study of this group of plants. Financial aid was given to this work by the Connecticut Agricultural Experiment Station.

Self-evident errors, and such as may readily be detected by reference to the bibliography or index, are not listed here.

The names of newly listed hosts are preceded by an asterisk ("*").

For convenience of reference the keys to the species of the larger genera have been corrected and revised, and are here reprinted in full.

USTILAGINACEAE

1. USTILAGO

A. Spores reddish-brown, olive-brown, or black-brown.

1. Spores perfectly smooth (see also nos. 3, 19, 25, 33).
Spores small, 4–10 μ long.
Sori around the internodes.
Sori with false membrane of fungous threads. 1. *U. minima*; p. 5
Sori without evident false membrane. 2. *U. hypodytes*; p. 5
Sori often producing witches brooms. 2a. *U. Shiraiana*; p. 979
Sori in leaf-sheaths or blades; spores 8–11 μ long. 4. *U. calcaria*; p. 6
Sori in individual spikelets.
Spores lighter-colored on one side.
Sori small, about 1 mm. long. 5. *U. mexicana*; p. 6
Sori 6–10 mm. long.
Host: *Hordeum*; spore-mass purple-black. 6. *U. Hordei*; p. 6
Host: *Avena*; spore-mass brown-black. 7. *U. levis*; p. 7
Spores uniformly colored.
Sori completely destroying spikelets.
Host: *Cynodon*. 13a. *U. Cynodontis*; p. 981
Host: *Hilaria*, *Stenotaphrum*. 14. *U. affinis*; p. 9
Sori usually destroying inner and basal parts. 17. *U. Cramerii*; p. 10
Sori involving entire inflorescence. 20. *U. Panic-prolifera*; p. 11
Sori composed of hypertrophied tissue. 37a. *U. esculenta*; p. 986
Spores medium, 10–14 μ long; sori in ovaries. 18. *U. lycuroides*; p. 10
Spores large, 13–22 μ long. 50a. *U. Griffithsii*; p. 988
Sori in the panicle. 58. *U. Heufleri*; p. 20
Sori in the leaves.
2. Spores often apparently smooth but at least granular under an immersion lens.
Sori in leaves.
Spores 4–8 μ long. 3. *U. longissima*; p. 6
Spores 7–12 μ long. 3a. *U. Davisii*; p. 979
Sori in inflorescence, sometimes confined to spikelets. 13. *U. residua*; p. 9
Sori in spikelets. 15. *U. Lorentziana*; p. 9
Sori rather completely destroying spikelets. 15a. *U. bullata*; p. 983
Sori destroying only basal and inner parts. 16. *U. bromivora*; p. 10
Spores rather brittle. 19. *U. Rickerii*; p. 11
Spores not so brittle. 23. *U. Tillandsiae*; p. 11
Sori in ovaries; spores apparently smooth.
Sori in flowers protected by perianth.
3. Spores echinulate or verruculose (occasionally minutely or obscurely).
Spores small, 4–9 μ long.
Sori in leaves. 21. *U. Ulei*; p. 11
Sori in striae or areas of considerable extent. 31. *U. minor*; p. 13
Sori pustular.

- Sori in spikelets.
 Sori destroying inner and basal parts of spikelets.
 Sori rather completely destroying spikelets.
 Host: *Avena*.
 Host: *Hordeum*.
 Host: *Triticum*.
 Host: *Lolium*.
 Host: *Tripsacum*.
- Sori involving or aborting inflorescence.
 Sori ovoid to subspheric; spores 4-6 μ long.
 Sori linear; spores 6-11 μ long.
- Sori in ovaries.
 Spores obscurely echinulate, often appearing smooth.
 Spores uniformly colored, 4-6 μ long.
 Spores often lighter-colored on one side.
 Spores evidently echinulate or verruculose.
 Spores medium, 9-14 μ long (see also nos. 21, 47).
- Sori on various parts of host.
 Sori in upper part of culm.
 Sori in ovaries, nodes, etc., pustular, smooth.
 Spores 9-7 μ long.
 Spores 9-12 μ long.
- Sori at nodes and on leaves, nodular, hispid.
 Sori usually at nodes, conspicuous, ovate to lanceolate.
 Sori on any part of host, usually very conspicuous.
 Sori forming elongate outbreaks, aborting inflorescence.
- Sori in spikelets, infecting entire spike.
 Sori in inflorescence (see also nos. 39, 48, 52).
 Host: *Syntherisma (Panicum)*.
 Host: *Chloris*.
- Sori on leaves.
 Sori involving leaves at apex of culm and aborting inflorescence.
 Sori elongate-ellipsoidal, 5-10 mm. long.
 Sori linear, very elongate, often 1 dm. long.
- Sori in striae.
 Sori in ovaries (see also no. 34).
 Sori conspicuous, chiefly 3-6 mm., hispid.
 Sori rather inconspicuous, 1-4 mm. long.
 Spores echinulate.
 Host: *Eragrostis*.
 Host: *Bouteloua*.
 Host: *Tridens (Tricuspis)*.
 Spores minutely and obscurely verruculose.
 Spores very conspicuously echinulate.
 Spores with coarse, often acute tubercles.
 Sori very inconspicuous, 1 mm. in diameter or less.
- Spores large, 14-18 μ , rarely 12 μ , long.
 Sori on leaves.
 Sori forming oblong pustules.
 Spores echinulate.
 Spores smooth or obscurely verruculose.
 Sori 3-10 mm. long.
 Sori 1-5 mm. long.
 Sori forming linear striae; spores verrucose.
 Spores granular-verruculose; 14-18 μ long.
 Spores prominently verrucose; 13-20 μ long.
- Sori in inflorescence.
 Spores light-reddish-brown, minutely echinulate.
 Spores prominently echinulate; sorus with columella.
 Spores dark-reddish-brown, verruculose.
 Host: *Sporobolus*.
 Host: *Paspalum*.
 Host: *Festuca*.
- Sori in ovaries.
4. Spores coarsely verruculose to occasionally semi-reticulate; sori on leaves.
 Host: *Agropyron, Elymus*.
 Host: *Phalaris*.
 Host: *Panicularia (Glyceria, Scolochloa)*.
8. *U. perennans*; p. 7
 9. *U. Avenae*; p. 7
 10. *U. nuda*; p. 8
 11. *U. Tritici*; p. 8
 11a. *U. Lolii*; p. 981
 14a. *U. Petrakii*; p. 982
 12. *U. Muhlenbergiae*; p. 8
 22. *U. chloridicola*; p. 11
 25. *U. Sieglingiae*; p. 12
 26. *U. Triplasisidis*; p. 12
 27. *U. sparsa*; p. 12
 13b. *U. Jacksonii*; p. 982
 24a. *U. Coicis*; p. 984
 34. *U. togata*; p. 986
 (*U. pustulata*; p. 14)
 36. *U. Crus-galli*; p. 14
 37. *U. heterogena*; p. 15
 38. *U. Zeae*; p. 15
 39. *U. Kellermanii*; p. 15
 40. *U. neglecta*; p. 16
 46. *U. Rabenhorstiana*; p. 17
 51. *U. elegans*; p. 18
 48. *U. Aegopogonis*; p. 17
 52. *U. Dieliana*; p. 18
 53. *U. striaeformis*; p. 18
 35. *U. sphaerogena*; p. 14
 28. *U. spermophora*; p. 12
 29. *U. Boutelouae*; p. 13
 30. *U. Tricuspis*; p. 13
 41. *U. Uniolae*; p. 16
 43. *U. ornata*; p. 16
 44. *U. Sporoboli*; p. 16
 42. *U. Eriocaulii*; p. 16
 32. *U. Hieronymi*; p. 13
 33. *U. Pseudochloae*; p. 14
 33a. *U. Pseudohieronymi*; p. 985
 33b. *U. Bethelii*; p. 985
 54. *U. Calamagrostidis*; p. 19
 49. *U. Hilariae*; p. 18
 47. *U. Holwayana*; p. 17
 45. *U. Vilfae*; p. 17
 48a. *U. Schroeteriana*; p. 988
 50. *U. Mulfordiana*; p. 18
 50b. *U. sphaerocarpa*; p. 988
 55. *U. macrospora*; p. 19
 56. *U. echinata*; p. 20
 57. *U. Arthuri*; p. 20

B. Spores yellow or golden-brown.

- Spores reticulate, 15-18 μ long.
 Spores smooth or obscurely echinulate, 7-12 μ long.
 Spores coarsely verrucose, 13-20 μ long.
- 57a. *U. Vuijkii*; p. 990
 59. *U. Vaillantii*; p. 20
 60. *U. Oxalidis*; p. 20

C. Spores violet or purple.

- Spores very minutely and obliquely striate.
 Host: *Macounastrum* (*Koenigia*).
 Host: *Polygonum*.
 Spores though appearing smooth very minutely pitted-reticulate.
 Spores minutely verruculose.
 Spores with winged reticulations.
 Sori in stems, petioles and midribs.
 Sori in inflorescence and floral axis.
 Sori in flowers or their organs.
 Sori in ovaries and often stamens, inclosed by floral envelopes.
 Spores small, 7-10 μ long, minutely reticulate (1 μ).
 Spores medium, 10-14 μ long.
 Spores dark-purple; reticulations inconspicuous (1 μ), showing as papillae at margin.
 Spores purplish; reticulations small to medium.
 Spores light-violet, rather finely reticulate (1-3 μ).
 Spores purplish; reticulations coarser (2-4 μ).
 Spores large, 14-17 μ long; reticulations 1.5-2 μ .
 Sori in anthers.
 Spores 5-8 μ long.
 Spores 7-12 μ long.
 Sori in seeds, spores 12-18 μ long; reticulations about 1 μ .
 Host: *Gayophytum*.
 Host: *Claytonia*.
69. *U. Koenigiae*; p. 23
 70. *U. Piperii*; p. 23
 71. *U. punctata*; p. 23
 72. *U. Bistortarum*; p. 24
 68. *U. Parlatoresii*; p. 23
 67. *U. Runicis*; p. 23
 61. *U. vinosa*; p. 21
 62b. *U. Alsineae*; p. 991
 62c. *U. Duriaecana*; p. 991
 65. *U. anomala*; p. 22
 66. *U. utriculosa*; p. 22
 64. *U. Calandriniae*; p. 22
 62. *U. violacea*; p. 21
 62a. *U. Clintoniana*; p. 991
 63. *U. Gayophyti*; p. 21
 63a. *U. Claytoniae*; p. 991

Ia. FARYSIA

One species.

- 1.
- F. olivacea*
- ; p. 993

2. SPHACELOTHECA

- Spores olive- or reddish-brown.
 Sori in ovaries.
 Spores chiefly 5-8 μ long, smooth.
 Sterile cells small.
 Sterile cells large.
 Spores chiefly 8-12 μ long.
 Spores apparently smooth.
 Sori linear.
 Host: *Andropogon*.
 Spores 7-12 μ long.
 Spores 14-18 μ long.
 Host: *Sorghastrum* (*Chrysopogon*).
 Sori oblong to ovate.
 Spores verruculose.
 Host: *Heteropogon* (*Andropogon*).
 Host: *Echinochloa*, *Syntherisma*, *Panicum*.
 Spores minutely verruculose.
 Spores coarsely verruculose.
 Host: *Chaetochloa* (*Setaria*).
 Host: *Pennisetum*.
 Spores chiefly 12-17 μ long.
 Sori involving or aborting the entire inflorescence.
 Sori linear to oblong.
 Sori 10-40 mm. long.
 Spores 7-10 μ long.
 Spores 12-15 μ long.
 Host: *Hackelochloa* (*Manisuris*).
 Host: *Andropogon*.
 Spores 15-18 μ long.
 Spores 10-16 μ long.
 Host: *Muhlenbergia*.
 Host: *Eragrostis*.
 Sori 30-150 mm. long.
 Spores 6-8 μ long.
 Sterile cells not guttulate.
 Sterile cells, guttulate.
 Spores 7-10 μ long.
 Spores verruculose.
 Spores smooth.
 Spores 9-13 μ long.
 Spores lilac-tinted to purple, 8-17 μ long.
 Sori in inflorescence.
 Sori in ovaries.
 Spores verruculose, 10-17 μ long.
 Spores apparently smooth, 9-11 μ long.
1. *S. Sorghi*; p. 25
 1a. *S. cruenta*; p. 994
 2. *S. Seymouriana*; p. 25
 8a. *S. panamensis*; p. 995
 3. *S. Chrysopogonis*; p. 26
 4. *S. Nealii*; p. 26
 5. *S. monilifera*; p. 26
 6. *S. diplospora*; p. 26
 6a. *S. veracruziana*; p. 994
 7. *S. pamparum*; p. 27
 7a. *S. Penniseti-japonici*; p. 995
 8. *S. occidentalis*; p. 27
 9. *S. Ischaemi*; p. 27
 9a. *S. erythraeensis*; p. 996
 9b. *S. culmiperda*; p. 997
 9c. *S. Kellermanii*; p. 997
 13. *S. montaniensis*; p. 29
 14. *S. strangulans*; p. 29
 10b. *S. Digitaliae*; p. 998
 11. *S. cordobensis*; p. 998 (*S. Panici-leucophuei*; p. 28)
 10. *S. Paspali-nolati*; p. 28
 10a. *S. Panici-miliacei*; p. 997
 12. *S. Andropogonis-hirtifolii*; p. 28
 10a. *S. inflorescentiae*; p. 999
 16. *S. Hydriperis*; p. 30
 16b. *S. borealis*; p. 999

3. MELANOPSISICHUM

One species.

1. *M. austro-americanum*; p. 30

4. CINTRACTIA

Sori usually dusty at maturity (see also no. 11).

Spores falsely two-celled.

Spores apparently smooth (rarely pitted).

Spores chiefly 8-14 μ long.

Spores light reddish-brown.

Spores dark reddish-brown.

Spores chiefly 12-19 μ long.

Spores often with lateral hyaline wings.

Spores under an immersion reticulately pitted.

Spores apparently quite smooth, irregular.

Spores with coarse scales.

Sori usually rather firmly agglutinated at maturity.

Sori on leaves.

Sori in ovaries.

Sori usually spheric or subspheric.

Spores with evident hyaline envelopes.

Spores without evident hyaline envelopes.

Spores 16-20 μ long, rarely longer.Spores 20-30 μ long.

Sori chiefly ovoid, rarely subspheric.

Sori surrounding peduncles (rarely in inflorescence).

Sori without prominent false membrane, linear.

Sori with prominent white fungous membrane.

Sori subspheric.

Spores smooth.

Spores 12-18 μ long.Spores 10-13 μ long.Spores verruculate, 11-15 μ long.

Sori oblong to linear.

Spores verruculate.

Spores with semi-spiral striae.

Spores with reticulated striae.

Spores densely opaque.

- 1a. *C. Farlowii*; p. 1000

2. *C. Taubertiana*; p. 32

4. *C. limitata*; p. 32

1. *C. Montagnei*; p. 31

3. *C. Psilocaryae*; p. 32

5. *C. Cyperi*; p. 32

6. *C. subinclusa*; p. 32

- 3a. *C. arctica*; p. 1001

8. *C. externa*; p. 34

7. *C. Caricis*; p. 33

9. *C. Luculae*; p. 34

12. *C. utriculicola*; p. 35

10. *C. Junci*; p. 34

11. *C. axicola*; p. 35

- 11a. *C. minor*; p. 1003

- 11b. *C. Clintonii*; p. 1003

13. *C. leucoderma*; p. 35

- 13a. *C. striata*; p. 1004

- 13b. *C. affinis*; p. 1004

- 13c. *C. pachyderma*; p. 1004

5. SCHIZONELLA

One species.

1. *S. melanogramma*; p. 36

6. MYCOSYRINX

One species.

1. *M. Cissi*; p. 37

7. SOROSPORIUM

Sori large irregular masses, usually destroying the panicle.

Sori in the ovaries, usually small.

Spore-balls quite temporary.

Spores 6-9 μ long.Spores 8-12 μ long.Spores 11-16 μ long.

Spores chiefly smooth.

Spores verruculose.

Spore-balls rather permanent.

Spores 8-12 μ long, light-reddish-brown.Spores 10-16 μ long, dark-reddish-brown.

Sori aborting the inflorescence, very elongate.

Spore-balls composed of many spores.

Spores rather thin-walled.

Spores 9-13 μ long.

Spores chiefly smooth.

Spores chiefly verruculose.

Spores 12-19 μ long.Host: *Andropogon*, *Aristida*, *Schizachyrium*.Host: *Cerastium*, *Silene*, *Stellaria*.Spores rather thick-walled (3 μ).

Spore-balls composed of few spores, usually 6-20.

- 1a. *S. Reilianum*; p. 1005

1. *S. consanguineum*; p. 37

- 2a. *S. ovarium*; p. 1005

2. *S. Eriochloae*; p. 38

- 2b. *S. confusum*; p. 1006

3. *S. Everhartii*; p. 38

9. *S. Rhynchosporae*; p. 40

4. *S. contortum*; p. 38

5. *S. Syntherismae*; p. 38

6. *S. Ellisii*; p. 39

- 6a. *S. Saponariae*; p. 1007

7. *S. provinciale*; p. 39

8. *S. granulosum*; p. 39

8. THECAPHORA

- Sori pustular, 10–20 mm., on stems.
 Sori pustular, 1–5 mm., on various parts of hosts.
 Spore-balls of 2–6 spores.
 Spore-balls of 15–30 spores.
 Spore-balls of 3–15 spores.
 Spore-balls of 10 or more spores.
 Spore-balls of 70 or more spores.
 Sori in flowers.
 Sori in ovaries.
 Sori indefinite, in the inflorescence.
 Sori in the flower heads.
 Spore-balls of 2–6 spores.
 Spore-balls of 7–20 spores.
 Spore-balls of 40–75 spores.
 Sori inside bracts of staminate spikes.
 Sori in the seeds.
- 1a. *T. pustulata*; p. 1007
 1. *T. pilulaeformis*; p. 40
 6. *T. mexicana*; p. 42
 7a. *T. Haumani*; p. 1008
 7b. *T. Iresine*; p. 1008
 7. *T. tunicata*; p. 42
 8. *T. Thornberi*; p. 42
 2. *T. Trailii*; p. 41
 3. *T. californica*; p. 41
 4. *T. cuneata*; p. 41
 9. *T. aterrima*; p. 43
 5. *T. deformans*; p. 41

9. TOLYOSPORELLA

- Sori composed of definite spore-balls.
 Sori composed of spores rather indefinitely agglutinated.
 Sori hidden on inner surface of leaf-blades and leaf-sheaths.
 Spores without concentric layers.
 Spores with faint concentric layers.
 Sori on exposed surface of leaves.
1. *T. Chrysopogonis*; p. 43
 1a. *T. Sporobolii*; p. 1009
 2. *T. Brunckii*; p. 43
 3. *T. Nolinae*; p. 44

10. TOLYOSPORIUM

- Sori 2–5 mm. long; spores polygonal or irregularly subspheric.
 Sori destroying the inflorescence.
 Sori occupying only an occasional ovary.
 Sori usually occupying all of the ovaries.
 Sori 1–2 mm. long; spores uniformly subspheric.
- 1a. *T. Junci*; p. 1010
 1. *T. bullatum*; p. 44
 2. *T. globuligerum*; p. 44
 3. *T. Eriocauli*; p. 45

11. TESTICULARIA

- One species.
1. *T. Cyperi*; p. 45

TILLETIACEAE

1. TILLETIA

- Spores smooth.
 Spores reticulate.
 Sori 5–8 mm. long.
 Spores 16–22 μ long.
 Spores 23–28 μ long.
 Sori 3–5 mm. long.
 Sterile cells chiefly thin-walled; smaller than spores.
 Spores chiefly 25–30 μ long.
 Spores reddish-brown.
 Spores light-reddish-brown.
 Spores golden-brown.
 Spores 20–25 μ long.
 Spores golden-yellow.
 Spores reddish-brown.
 Spores 28–34 μ long.
 Sterile cells with very thick walls (3–6 μ); larger than spores.
 Sori 1 or 2 mm. long.
 Sterile cells chiefly thin-walled; smaller than spores.
 Spores chiefly 25–30 μ long.
 Spores 17–25 μ long.
 Sterile cells very thick-walled (3–8 μ); larger than spores.
 Spores apparently verruculose.
 Spores with prominent tubercles, spines or scales.
 Sori in the culms.
 Sori in the ovaries.
 Spores chiefly 18–27 μ long.
 Spores without pedicle-like projection of hyaline envelope.
 Spores with prominent tubercles.
 Sori 3–5 mm. long.
 Sori about 1 or 2 mm. long.
1. *T. foetans*; p. 48
 2. *T. Tritici*; p. 48
 3. *T. Elymi*; p. 48
 4. *T. Anthoxanthi*; p. 48
 9a. *T. Holci*; p. 1011
 11a. *T. decipiens*; p. 1012
 4a. *T. Guyotiana*; p. 1011
 8. *T. fusca*; p. 49
 5. *T. Muhlenbergiae*; p. 49
 10. *T. Redfieldiae*; p. 50
 6. *T. cerebrina*; p. 49
 9. *T. montana*; p. 49
 11. *T. osperifolia*; p. 50
 12. *T. Maclagani*; p. 50
 13. *T. Earlei*; p. 50
 14. *T. texana*; p. 51

- Mature spores ? but slightly tinted.
 Mature spores golden-brown.
 Mature spores chocolate-brown.
 Host: *Bulbilis* (*Buchloe*).
 Host: *Cathestecum*.
 Spores with coarse scale-like appendages.
 Spores with pedicle-like projections of hyaline envelope.
 Spores 25–35 μ long, occasionally smaller; with coarse scales.
 Sori about 3–4 mm. long.
 Completely destroying the seed.
 Incompletely destroying the seed.
 Sori 1 mm. long or less.
15. *T. Wilcoxiana*; p. 51
 15a. *T. Youngii*; p. 1012
 16. *T. buchloeana*; p. 51
 17. *T. Cathesteci*; p. 51
 19. *T. rugispora*; p. 52
 18. *T. corona*; p. 52
 20. *T. pulcherrima*; p. 52
 21. *T. horrida*; p. 52
 22. *T. Eragrostidis*; p. 53

2. NEOVOSSIA

One species.

1. *N. iowensis*; p. 53

3. TUBURCINIA

Spore-balls, of 6 to many spores, 27–75 μ long.
 Spore-balls, of 10 to many spores, 45–100 μ long.

1. *T. Clintoniae*; p. 54
 2. *T. Tricentalis*; p. 54

4. UROCYSTIS

Sori in leaves, pedicels, or stems.
 Spore-balls without a true cortex.
 Spore-balls with a true cortex.
 Spores usually 1–5 in the balls.
 Cortical cells incompletely covering spores.
 Cortical cells rather completely covering spores.
 Spores usually 4–8 in the balls.
 Cortical cells 8–15 μ ; spore-balls 30–60 μ , rarely 90 μ .
 Sori on stems.
 Sori in ovaries.
 Cortical cells 6–10 μ ; spore-balls chiefly 28–55 μ .
 Spores usually 1, rarely 2–4, in the balls.
 Cortical cells 6–10 μ , rarely 12 μ .
 Cortical cells usually 4–8 μ .
 Cortical cells slightly tinted.
 Cortical cells light-brown.
 Spores usually 1 or 2, rarely 3 or 4, in the balls.
 Sori in areas or pustules.
 Sori in striae.
 Cortical cells incompletely covering spores.
 Cortical cells completely covering spores.
 Spores usually 1–3, rarely 4 or 5, in the ball.
 Host: *Erythronium*.
 Host: *Triticum*.
 Host: *Carex*.
 Spores usually 5–15 in the ball.
 Sori in the stems.
 Spores usually 2–12 in the ball.
 Spores usually 10–15, rarely 20, in a ball.
 Sori on corms and leaves.
 Sori in the culm filling the interior.
 Sori in the inflorescence.
 Sori in the spikelets.
 Sori in the flowers and pedicles.
 Sori on base of stem or roots.
 Host: *Gilia*.
 Host: *Sophia*.

1. *U. Waldsteiniae*; p. 55
 2. *U. Anemones*; p. 55
 3. *U. carcinodes*; p. 55
 4. *U. sorosporioides*; p. 56
 5a. *U. Kmetiana*; p. 1014
 5. *U. Violae*; p. 56
 6. *U. Lithophragmae*; p. 56
 7. *U. Cepulae*; p. 57
 7a. *U. magica*; p. 1015
 8. *U. Colchici*; p. 57
 9. *U. occulta*; p. 57
 10. *U. Agropyri*; p. 58
 7b. *U. Erythronii*; p. 1015
 9a. *U. Tritici*; p. 1017
 10a. *U. Fischeri*; p. 1018
 8b. *U. Flowersii*; p. 1016
 8a. *U. Trillii*; p. 1016
 12a. *U. Fraserii*; p. 1018
 8c. *U. Gladioli*; p. 1016
 11. *U. Junci*; p. 58
 12. *U. granulosa*; p. 58
 13. *U. Hypoxyis*; p. 59
 13a. *U. Giliae*; p. 1018
 13b. *U. coralloides*; p. 1019

5. ENTYLOMA

Sori black.
 Spores tinted reddish-brown, agglutinated.
 Spores chiefly 8–14 μ long.
 Sori forming oblong to linear striae.
 Spores 7–11 μ long.
 Spores 8–14 μ long.
 Spores chiefly regular.
 Spores often irregular and elongate.
 Sori often fusing to form a continuous stratum.
 Spores chiefly 15–22 μ long.
 Spores tinted yellowish-brown, agglutinated.
 Spores chiefly 7–10 μ long.

1. *E. lineatum*; p. 60
 2. *E. crastophilum*; p. 60
 3. *E. irregulare*; p. 60
 4. *E. speciosum*; p. 60
 5. *E. caricinum*; p. 61
 5a. *E. parvum*; p. 1020

- Sori white to reddish-brown; spores hyaline, or yellowish-tinted.
 Spores not apiculate, often agglutinated.
 Sori thin—in the unthickened tissues.
 Conidia or sporidia hypophyllous.
 Spores chiefly 8–13 μ long, thin-walled (see also no. 16).
 Sori angular.
 Sori without evident hypophyllous growth. 6. *E. Thalictri*; p. 61
 Sori with evident hypophyllous growth. 8. *E. Menispermi*; p. 61
 Host: Menispermaceae.
 Host: Ambrosiaceae, Carduaceae, Cichoriaceae. 9. *E. compositarum*; p. 62
 Sori circular. 14. *E. Floerkeae*; p. 63
 Spores chiefly 11–16 μ long, thick-walled.
 Spore-walls evidently double.
 Spore-walls not papillate.
 Spores reddish-yellow. 7. *E. Ranunculi*; p. 61
 Spores golden-yellow. 7a. *E. Meliloti*; p. 1020
 Spores light-yellow. 9a. *E. Achilleae*; p. 1021
 Spore-walls, occasionally, with evident papillae. 12. *E. arnicale*; p. 63
 Double walls of spores not very evident.
 Sori rather conspicuous, 2–5 mm. or even larger.
 Sori yellowish above, white beneath; spores chiefly 9–12 μ . 16. *E. Lobeliae*; p. 64
 Sori yellowish or reddish-brown, often bordered. 17. *E. australe*; p. 64
 Sori small, usually less than 2 mm. in diameter.
 Sori angular, usually with evident whitish growths. 19. *E. Saniculae*; p. 64
 Sori chiefly subcircular.
 Spores chiefly 9–12 μ in diameter. 21. *E. Linariae*; p. 65
 Spores chiefly 13–14 μ in diameter. 21a. *E. Veronicae*; p. 1024
 Spores chiefly 14–19 μ long.
 Spores regular, subspheric.
 Spores ovoid to subspheric, often angular. 22. *E. Ellisii*; p. 65
 24. *E. fuscum*; p. 66
 Conidia lacking or not observed.
 Host: Ambrosiaceae, Carduaceae.
 Sori often indefinite. 10. *E. polysporum*; p. 62
 Sori conspicuous, reddish-brown. 11. *E. Holwayi*; p. 62
 Sori irregular, 3–12 mm. 11a. *E. Dahliae*; p. 1022
 Sori oval to subcircular. 11b. *E. Calendulae*; p. 1022
 Sori 5–6 mm. in diameter. 14a. *E. bavaricum*; p. 1023
 Sori 3–5 mm. in diameter. 14b. *E. Agoseridis*; p. 1023
 Sori whitish, circular. 13. *E. guaraniticum*; p. 63
 Sori often concavo-convex.
 Host: not Ambrosiaceae, Carduaceae.
 Spores often with hyphal pedicels.
 Sori angular. 11c. *E. Circaeae*; p. 1022
 Sori subcircular. 15. *E. Collinsiae*; p. 63
 Spores without hyphal appendages.
 Sori subcircular, conspicuous.
 Spores smooth.
 Sori 2–5 mm. diameter. 18. *E. serotinum*; p. 64
 Sori 1–2 mm. diameter. 21b. *E. Clintonianum*; p. 1024
 Spores verrucose. 21c. *E. Gratiolae*; p. 1025
 Sori angular, often indefinite, less than 2 mm. 20. *E. Eryngii*; p. 65
 Sori small, usually bordered. 23. *E. Eschscholtziae*; p. 65
 Sori forming hard pustules, often concavo-convex. 25. *E. microsporium*; p. 66
 Spores apiculate and pedicellate, never adhering. 26. *E. Nymphaeae*; p. 66

6. BURRILLIA

- Sori forming scattered thickened spots in leaves.
 Spore-balls small, 37–140 μ .
 Spores 8–12 μ in diameter. 1. *B. decipiens*; p. 67
 Spores 15–19 μ in diameter. 1a. *B. Limnanthemii*; p. 1026
 Spore-balls large, 160–250 μ . 2. *B. Echinodori*; p. 67
 Sori forming small hypophyllous blisters. 3. *B. pustulata*; p. 67
 Sori embedded in lacunae within the leaf. 4. *B. Acori*; p. 1026

7. DOASSANSIA

- EUDOASSANSIA. Spore-balls within the cortex consisting entirely of spores.
 Sori forming scattered thickened spots in leaves.
 Cortical cells inconspicuous, 3–10 μ long; spores smooth.

- Host: Onagraceae.
 Host: Lobeliaceae.
 Cortical cells conspicuous, 10–20 μ long.
 Spores verrucose.
 Spores smooth.
 Cortical cells oblong to cubic; spore-balls 100–160 μ .
 Cortical cells ovate to subspheric; spore-balls 100–125 μ .
 Cortical cells radially elongate, chiefly oblong; spore-balls 120–180 μ .
 Sori forming opaque pustules in leaves.
 DOASSANSIOPSIS. Spore-balls within the cortex consisting of one or more layers of spores and a central mass of parenchymatous cells.
 Sori in ovaries.
 Sori in leaves.
 Sori not causing distortion of tissues.
 Sori dark colored.
 Sori yellowish.
 Spore-balls subspheric or spheric, 100–160 μ .
 Spore-balls ellipsoid or spheric, 200–300 μ .
 Sori causing conspicuous distortion of tissues.
 PSEUDODOASSANSIA. Spore-balls within the cortex consisting of several layers of spores and a central mass of interwoven hyphae.

1. *D. Epilobii*; p. 68
- 1a. *D. Downingiae*; p. 1026
- 1b. *D. Callitriches*; p. 1027
2. *D. ranunculina*; p. 68
3. *D. Sagittariae*; p. 69
4. *D. Alismatis*; p. 69
5. *D. opaca*; p. 69
6. *D. occulta*; p. 70
- 6a. *D. furva*; p. 1027
7. *D. Martianoffiana*; p. 70
8. *D. intermedia*; p. 70
9. *D. deformans*; p. 71
10. *D. obscura*; p. 71

8. TRACYA

One species.

1. *T. Lemnae*; p. 71

Family 1. USTILAGINACEAE

5. *Ustilago minima*.

Add, under POACEAE:

- Eriocoma hymenoides* (*Oryzopsis cuspidata*), Colorado.
 **Sitanion Hystrix*, California.
 **Stipa comata*, California.
 **Stipa neomexicana*, Arizona.
 **Stipa Scribneri*, Colorado.

5. *Ustilago hypodytes*.

Add the synonyms: *Cintractia distichlydis* McAlpine, Smuts Austr. 169. 1910. (Type from Australia, on *Distichlis maritima*.) ? *Ustilago agrestis* H. Sydow, Ann. Myc. 22: 278. 1924. *Ustilago distichlydis* Ciferri, Ann. Myc. 26: 32. 1928.

Add, under POACEAE:

- **Agropyron repens*, New York.
Agropyron Smithii (*Agropyron occidentale*), Colorado.
Distichlis spicata (*D. maritima*), Utah.
Elymus condensatus, Utah.
 **Elymus triticoides*, California, Nevada.
Eriocoma hymenoides (*Oryzopsis cuspidata*), California, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.
 **Festuca Kingii*, Wyoming.
 **Hilaria Jamesii*, Utah.
 **Melica bulbosa* (*M. bella*), California.
 **Panicum virgatum*, New York.
 **Poa* sp., New York; Ontario.
Sitanion Hystrix (*S. californicum*, *S. longifolium*), New Mexico, Utah.
 **Stipa clandestina*, Mexico.
 **Stipa columbiana*, Colorado.
Stipa comata, California, South Dakota, Wyoming; Saskatchewan.
 **Stipa Elmeri*, California.
 **Stipa Lemmoni*, California.
 **Stipa leucotricha*, Texas.
 **Stipa neomexicana*, New Mexico.
Stipa occidentalis, California.
Stipa setigera, Mexico; Panama.
Stipa spartea, Iowa, Minnesota, North Dakota, Wisconsin.
 **Stipa speciosa*, California, Nevada.
Stipa viridula, Colorado, North Dakota; Alberta, Manitoba.
Stipa sp., Puebla.

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 13; Phytop. Zeits. 9: f. 1–6.

Add the exsiccati: Barth. Fungi Columb. 4794; Brenckle, Fungi Dak. 542, 675; Vesterg. Micr. Rar. Sel. 898, 899, 900.

Add the note: In western specimens on certain hosts, as *Puccinellia* and *Sitanion*, the sori often occur in the inflorescence and leaves as linear striae, and on other hosts only in the leaves. In the east, on *Panicum virgatum*, from Staten Island, the striae also break out on the leaves. These unusual forms are difficult to distinguish by their spores alone from either *Ustilago hypodytes* or *U. longissima* (normally on the leaves), but are placed here under the former chiefly because of its great variety of hosts, in some of which the outbreaks occur on tissues other than the culms.

6. Insert:

2a. *Ustilago Shiraiana* P. Henn. Bot. Jahrb. 28: 260. 1900.

Cintractia Bambusae Miyabe & Hori; Yoshino, Bot. Mag. Tokyo 19: (199). 1905.

Sori surrounding the stems, especially on the young end-branches, rarely in closely placed striae or pustules on the older stems, at first covered by the epidermis but soon naked, forming oblong to linear-cylindric, agglutinated to semi-dusty, black-brown outbreaks, chiefly 5-10 mm. in length, more or less concealed by sheaths of the leaves, often producing witches-broom effect; spores light-brown, chiefly subspheric to spheric but occasionally more elongate, smooth, chiefly 5-9 μ but occasionally on some hosts more than 11 μ in length.

ON POACEAE:

Phyllostachys bambusoides, California, Florida, Louisiana.

Phyllostachys Henonis, California, Louisiana.

Phyllostachys Quiltoi, Louisiana.

Phyllostachys sp., Florida, Mississippi.

TYPE LOCALITY: Nikko, Japan, on *Bambusa Veitchii*.

DISTRIBUTION: Japan, China and India; introduced in the United States occasionally on imported specimens but apparently not yet escaped.

EXSICCATI: Vesterg. Micr. Rar. Sel. 1597.

NOTE: This smut on some specimens, and as originally described, has small spores very similar to those of *Ustilago hypodytes*, but on other specimens, especially those on *Phyllostachys*, the spores are more variable and attain a larger size. *Cintractia Bambusae* is said to occur in the leaves, but is given by Ideta as a synonym of this species, and a specimen we have labeled *Ustilago Bambusae* Miyabi on *Bambusa senamensis* from Japan is on the stems and belongs here.

6. *Ustilago longissima*.

Add, under POACEAE:

Glyceria grandis (*Panicularia americana*), Colorado, Nebraska, North Dakota, Oregon, Pennsylvania, Utah, Washington; Alberta, British Columbia, Manitoba, Saskatchewan.

**Glyceria obtusa* (*Panicularia obtusa*), Pennsylvania.

**Glyceria striata* (*G. nervata*, *Panicularia nervata*), Pennsylvania, Utah.

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 12; Arch. Nat. Land. Böhmen 15²: f. 5.

Add the exsiccati: Sydow, Ust. 382; Barth, Fungi Columb. 2399, 4098, 4199; Brenckle, Fungi Dak. 135.

6. Insert:

3a. *Ustilago Davisi* Liro, Ann. Acad. Sci. Fenn. A. 17: 80. 1924.

Ustilago longissima var. *macrospora* Davis, Trans. Wis. Acad. 11: 174. 1897. (Described under this name on page 6.)

ON POACEAE:

**Glyceria canadensis*, New Hampshire.

Glyceria fluitans, Michigan, Mississippi; Ontario.

TYPE LOCALITY: Wisconsin, on *Glyceria fluitans*.

EXSICCATI: Barth, Fungi Columb. 4598.

6. *Ustilago Hordei*.

Add, under POACEAE:

**Hordeum distichon*, Colorado.

**Hordeum vulgare* (*H. sativum*), Alabama, Arizona, Arkansas, Delaware, Georgia, Idaho, Kentucky, Maryland, Minnesota, Montana, Nebraska, Nevada, New Jersey, New Mexico, Oklahoma, Pennsylvania, Tennessee, Texas, Utah, Virginia, Wyoming, Alberta, Manitoba, New Brunswick, Ontario, Prince Edward Island, Quebec, Saskatchewan; San Luis Potosí.

**Hordeum vulgare* var. *trifurcatum*, Colorado, New Mexico.

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 5; Arch. Nat. Land. Böhmen 15³: f. 3.

Add the exsiccati: Barth. Fungi Columb. 3398, 3794, 4397.

7. *Ustilago levis*.

Add, under POACEAE:

**Avena fatua*, Kansas; Saskatchewan.

**Avena fatua* var. *glabrata*, Washington.

**Avena nuda* var. *elegantissima*, Missouri.

**Avena orientalis*, Colorado.

Avena sativa, Alabama, Arkansas, California, Colorado, Delaware, Florida, Georgia, Idaho, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Vermont, Virginia, Wyoming; Alberta, British Columbia, Manitoba, New Brunswick, Ontario, Prince Edward Island, Quebec, Saskatchewan; Bermuda.

Add the illustration: Arch. Nat. Land. Böhmen 15³: f. 2.

Add the exsiccati: Barth. Fungi Columb. 3399 (mixed with *U. Avenae*), 3795, 4398 (mixed); Brenckle, Fungi Dak. 90.

Add the note: By artificial inoculation Fischer has infected the following grasses with this smut: *Agropyron pauciflorum*, *A. secundum*, and *Hordeum nodosum* (see Phytopathology 26: 876-886. 1936).

7. *Ustilago perennans*.

Add the synonyms: *Uredo segetum* var. *decipiens* Wallr. Annus Bot. 139, in part. 1815. *Ustilago decipiens* Liro, Ann. Acad. Sci. Fenn. A. 17: 95. 1924.

Add, under POACEAE:

Arrhenatherum elatius (*A. avenaceum*), Georgia, Idaho, Kentucky, Maryland, Michigan, Missouri, New Jersey, North Carolina, Oregon, Pennsylvania, Virginia, Washington, West Virginia; British Columbia, Ontario, Quebec.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 4.

7. *Ustilago Avenae*.

Add, under POACEAE:

**Avena barbata*, California.

Avena fatua, Saskatchewan.

**Avena orientalis*, Colorado.

Avena sativa, Arizona, Arkansas, Colorado, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Nevada, Oregon, Pennsylvania, South Carolina, Utah, Virginia; Alaska; Alberta, British Columbia, Cape Breton Island, Manitoba, New Brunswick, Ontario, Prince Edward Island, Quebec, Saskatchewan; Bermuda.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 3.

Add the exsiccati: Barth. Fungi Columb. 2998.

Add the note: This smut has now been reported from every state in the United States and in each province of Canada on *Avena sativa*. Reed has also produced it artificially on the following species: *Avena barbata*, *A. fatua*, *A. ludoviciana*, *A. nuda*, *A. nuda* var. *inermis*, *A. orientalis*, *A. sterilis*, and *A. strigosa*.

8. *Ustilago nuda*.

Add the synonyms: *Ustilago medians* Biedenkopf, Zeits. Pflanzenkr. 4: 321. 1894. *Ustilago nuda* var. *foliicola* Trott.; Sacc. & Trott. Ann. Myc. 11: 415. 1913. *Ustilago nigra* Tapke, Phytopathology 22: 869. 1932.

Add, under POACEAE:

**Hordeum vulgare* (*H. sativum*), Arkansas, California, Colorado, Delaware, Georgia, Idaho, Indiana, Kentucky, Louisiana, Maine, Minnesota, Montana, New Jersey, New Mexico, North Dakota, Oklahoma, Pennsylvania, South Carolina, Tennessee, Utah, Virginia, Washington, Wyoming; Alberta, Manitoba, New Brunswick, Ontario, Prince Edward Island, Quebec, Saskatchewan; Puebla, Queretaro. (This species in some cases may include *Hordeum distichon* and *H. hexastichon*.)

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 2.

Add the exsiccati: Brenckle, Fungi Dak. 25.

Add the note: Several new forms, perhaps the result of natural hybridization, of *U. nuda* have been reported in recent years, of which *U. nigra* and *U. medians* are the best known. Taxonomically they must, for the present, be considered as synonyms of *U. nuda*. Economically *U. nuda* (*U. medians*) responds to different methods of control.

8. *Ustilago Tritici*.

Add the synonym: *Ustilago Varilovi* * Jacz. Ann. State Inst. Exp. Agr. III. 2-4: 106-109. 1925.

Add, under POACEAE:

**Secale cereale*, Illinois, Indiana, Kentucky, Minnesota, Missouri, New York, North Dakota, Oklahoma, Tennessee, Virginia, West Virginia.

Triticum aestivum (*T. sativum*, *T. vulgare*), Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Georgia, Maine, Maryland, Mississippi, Montana, Nevada, New Mexico, Oklahoma, Oregon, Pennsylvania, South Carolina, Utah, Virginia; Alberta, Manitoba, Nova Scotia, Ontario, Prince Edward Island, Quebec. (Perhaps this in some cases may include other cultivated species.)

**Triticum durum*, North Dakota, Manitoba, New Brunswick, Saskatchewan.

**Triticum Spelta*, Illinois.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 1.

Add the exsiccati: Brenckle, Fungi Dak. 574.

Add the note: Fischer reports finding this smut on *Agropyron cristatum* in central Washington as a natural infection. Later, artificially, the following grasses were infected: *Agropyron subsecundum*, *A. pauciflorum*, and *Hordeum nodosum* (see Phytopathology 26: 876-886. 1936).

8. Insert:

11a. *Ustilago Lolii* Magnus, Hedwigia 49: 93. 1909.

Ustilago segetum De-Toni, in Sacc. Syll. Fung. 7²: 461. 1888.

Sori in the spikelets more or less destroying the glumes and sometimes running down on the rachis as short striae; spores reddish-brown, somewhat lighter-colored on one side, minutely echinulate, ovoid to subspheric or spheric or occasionally irregular, 5-8 μ in length.

ON POACEAE:

Lolium temulentum, Alabama.

TYPE LOCALITY: Egypt, on *Lolium temulentum*.

DISTRIBUTION: Egypt; introduced into Alabama at Demopolis.

NOTE: This smut is closely related to *Ustilago Tritici*, but in our specimen evidently is less destructive to the spikelets, the sori running down somewhat on the rachis as short striae.

9. *Ustilago residua*.

Add, under POACEAE:

**Danthonia americana*, Oregon.

Danthonia compressa, Pennsylvania.

Danthonia intermedia, Montana.

Danthonia spicata, Indiana, Ohio, Pennsylvania, Virginia, West Virginia.

9. Insert:

13a. *Ustilago Cynodontis* P. Henn. Bot. Jahrb. 14: 369. 1891.

Sori in the inflorescence, changing its branches into linear dusty spore-masses with the floral parts all destroyed except the elongate crinkled rachis (or rarely with the destruction less complete and individual spikelets, chiefly the lower, infected, the upper being free but often abortive), 3-4 cm. in length, at first rather completely hidden by the enveloping leaf-sheaths; spores reddish-brown, subspheric or spheric, more or less cupped when dry, smooth, chiefly 6-8 μ in diameter.

* This smut was described as new on *Secale cereale* and the title of the publication in Russian is translated here. Recent experiments in the United States have shown that the smut occasionally found here on *Secale cereale* can be transferred to wheat and vice versa.

ON POACEAE:

Cynodon Dactylon, Arkansas, California, Texas; Cuba.

TYPE LOCALITY: Abyssinia, Africa, on *Cynodon Dactylon*.

DISTRIBUTION: Europe, Africa, Asia, southern United States.

ILLUSTRATION: Beitr. Krypt. Schweiz 3²: f. 6.

EXSICCATI: Barth. Fungi Columb. 4998.

NOTE: This species seems to be quite near *Ustilago affinis*. *U. Dregeana*, as originally described by Tulasne on an undetermined grass from Cape of Good Hope, has echinulate spores, but otherwise seems to agree; this species was later reported on *Cynodon Dactylon* from Africa, by Kalchbrenner, but with much larger spore-measurements, 12-15 μ . *Ustilago paraguayensis* Speg. also on this host, has larger spores as shown by the specimens from South Africa in Vesterg. Micr. Rar. Sel. 1322. It is quite possible that the Kalchbrenner specimen is the same as this last, as the specimens are somewhat similar. The original specimens need to be examined to determine the questions involved.

13b. *Ustilago Jacksonii* Zundel & Dunlap, sp. nov.

Sori on upper parts of culms, running into and aborting the inflorescence by involving the pedicels, often containing empty spore-like cells the nature of which has not been determined; spores dark-reddish-brown, ovoid to subspheric, granular-verruculose, chiefly 9-12 μ in length. (See page 1029.)

ON POACEAE:

Stipa Lettermani, Colorado.

Type collected at Tolland, Colorado, on *Stipa Lettermani*, by Ellsworth Bethel, August 13, 1921; communicated by H. S. Jackson as *Ustilago hypodytes*.

DISTRIBUTION: Colorado.

NOTE: This was recognized by Dr. Clinton as a new species, but he did not write a description or select a name. In general appearance the sori look very much like *Sorosporium granulosum* but there is no indication of spore-halls.

9. *Ustilago affinis*.

Add, under POACEAE:

Stenotaphrum secundatum (*S. americanum*), Bermuda; Dominican Republic; Puerto Rico.

Add the exsiccati: Ciferri, Myc. Doming. Exs. 82.

9. Insert:

14a. *Ustilago Petrakii* Ciferri, Ann. Myc. 29: 293. 1931.

Sori in the individual spikelets usually destroying all in the spike, at first agglutinated and apparently hidden by the leaf-sheath, but finally exposed revealing the dusty mass of spores which become dissipated and leave only the hard basal tissues, rarely in the leaf-sheaths and then agglutinated and more permanent; spores light-reddish-brown, ovoid to subspheric or spheric, apparently smooth, but actually with the wall on one side thicker and darker and with indications of minute echinulations, chiefly 5-9 μ in length.

ON POACEAE:

Tripsacum dactyloides, Santo Domingo.

TYPE LOCALITY: Cordillera Septentrional, prov. Puerto Plata, road to Puerto Plata, Santo Domingo, on *Tripsacum dactyloides*.

DISTRIBUTION: Santo Domingo.

EXSICCATI: Ciferri, Myc. Doming. Exs. 83.

NOTE: This species comes very close to *Ustilago affinis*, and shows its relationship with other species such as *U. Tritici*, under the immersion lens, by the thinner and darker sides of the spore-wall with indications of minute echinulations. Ciferri's specimen in his exsiccati shows most of the spores dissipated.

9. *Ustilago Lorentziana*.

Add, under POACEAE:

Elymus Macounii, Manitoba.

Hordeum caespitosum, Nevada, Wyoming.

Hordeum jubatum, Colorado, Idaho, Iowa, Minnesota, Washington, Wisconsin, Wyoming; Alaska; Alberta, British Columbia, Manitoba, Ontario, Quebec, Saskatchewan.

Hordeum murinum, Oregon.

Hordeum nodosum (*H. pratense*), Idaho, Washington.

Hordeum pusillum, Utah.

Hordeum sp., Utah. (Utah specimen labeled ? *Elymus triticoides*.)

**Sitanion Hystrix* (*S. californicum*), Utah.

Insert: ILLUSTRATIONS: *Mycologia* 29: 410. f. 3, 18.

Add the exsiccati: Barth. *Fungi Columb.* 3797.

10. Insert:

15a. *Ustilago bullata* Berk. in Hook. f. *Fl. Nov. Zeland.* 2: 196. 1855.

Ustilago Agropyri Bisby & Buller, *Trans. Brit. Myc. Soc.* 8: 98; hyponym. 1922.

Sori in the spikelets, usually infecting all but destroying only the slightly swollen basal parts, covered at first by a semi-transparent membrane of plant tissues which eventually ruptures and liberates the purple-black, dusty spore-mass; spores reddish-brown, broadly ovoid to spheric, chiefly subspheric, with the brittle epispore usually breaking up so as to form lighter granular-verruculate poles and a dark continuous or less broken equatorial band, chiefly 6-10 μ in length.

ON POACEAE:

Agropyron caninum, Wyoming.

Agropyron dasystachyum, Saskatchewan.

Agropyron pauciflorum (*A. tenerum*), Idaho, Minnesota, Washington; Alberta, Manitoba, Nova Scotia, Quebec, Saskatchewan.

Agropyron subsecundum (*A. Richardsoni*), Saskatchewan.

TYPE LOCALITY: Antarctic Regions, on *Triticum* (*Agropyron*) *scabrum*.

DISTRIBUTION: United States and Canada; also in the Antarctic Regions, Australia, New Zealand, and Asia Minor.

ILLUSTRATIONS: Hook. f. *Fl. Nov. Zeland.* 2: pl. 106, f. 12; *Mycologia* 29: 410. f. 1, 17.

EXSICCATI: Barth. *Fungi Columb.* 3796, 4530.

NOTE 1: This smut is near *Ustilago bromivora*, from which it differs in the hosts it attacks, its more evident appearance in the spikelets and the manner in which the epispore breaks up into the polar granular-verruculations (although *U. bromivora* has a very brittle epispore that breaks up into more uniformly scattered granular-verruculations). Quite distinct from *U. macrospora*, found on leaves of *Agropyron*.

NOTE 2: Recent cross-inoculation work by Fischer strongly indicates that *Ustilago bullata*, *U. bromivora*, and *U. Lorentziana* should be considered as one species (see *Mycologia* 29: 408-425. 1937).

10. *Ustilago bromivora*.

Add the synonym: *Ustilago palagonica* Ciferri, *Ann. Myc.* 26: 32. 1928. (Type on *Bromus unioloides*.)

Add, under POACEAE:

Bromus arvensis, New York.

Bromus breviaristatus, Michigan.

**Bromus carinatus*, California, Idaho, Oregon, Utah, Washington.

**Bromus calharticus* (*B. unioloides*), Colorado, North Dakota, Oregon, Texas.

**Bromus ciliatus* (*B. Richardsoni*), New Mexico; Saskatchewan.

**Bromus commutatus*, Oregon.

**Bromus commutatus* var. *apricorum*, Washington.

**Bromus japonicus*, Kansas.

Bromus Kalmii, Montana.

Bromus marginatus, Idaho, Montana, Nevada, Utah, Washington.

**Bromus marginatus* var. *laticor*, Washington.

Bromus mollis (*B. hordeaceus*), Colorado, Montana, Oregon, Utah.

Bromus polyanthus, Colorado, New Mexico, Wyoming.

Bromus Pumpellianus, Michigan, Montana.

**Bromus rigidus* (*B. villosus*), Oregon.

**Bromus secalinus*, Montana, Washington.

**Bromus secalinus* var. *velutinus*, Oregon.

**Bromus sterilis*, Washington.

**Bromus tectorum*, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming.

**Bromus Trinii*, California.

Bromus vulgaris, California.

Add the illustration: *Mycologia* 29: 417. f. 4-16.

Add the exsiccati: Barth. *Fungi Columb.* 4897; Brenckle, *Fungi Dak.* 475; Vesterg. *Micr. Rar. Sc.* 891; Sydow, *Ust.* 379, 380.

10. *Ustilago Crameri*.

Add, under POACEAE:

Chaetochloa italica (*Setaria italica*), Colorado, Minnesota, Missouri, Montana, Pennsylvania; Ontario, Saskatchewan.

Add the illustrations: *Beitr. Krypt. Schweiz* 3³: f. 9; *Arch. Nat. Land. Böhmen* 15³: f. 1.

11. *Ustilago Panici-proliferi*.

Add, under POACEAE:

**Panicum* sp., Jalisco.11. *Ustilago chloridicola*.

Add, under POACEAE:

*?*Chloris radiata*, Jamaica.**Chloris verticillata*, California.12. *Ustilago olivacea*.Becomes a synonym of *Farysia olivacea* (page 993).

12. Insert:

24a. *Ustilago Coicis* Bref. *Unters. Gesammt. Myk.* 12: 110. 1895.

Sori in the ovaries, destroying and deforming them and causing varying degrees of enlargement, sometimes attacking the culms, more or less hidden by the glumes and surrounded by a membrane, the mature spores forming a brown dusty mass; spores olivaceous-brown, ovoid to subspheric or spheric, regular, echinulate, 9-7 μ in length.

ON POACEAE:

Coix Lacryma-Jobi, District of Columbia (in greenhouse, from Philippine Islands seeds).TYPE LOCALITY: Simla, India, on *Coix Lacryma-Jobi*.

DISTRIBUTION: Washington, District of Columbia (in greenhouses); India, Japan, Java, and the Philippines.

ILLUSTRATION: *Phytopathology* 10: 332.12. *Ustilago Sieglingiae*.

Add, under POACEAE:

Triplasis purpurea (*Sieglingia purpurea*), Illinois, Iowa, North Carolina.12. *Ustilago spermophora*.Add the synonym: *Sphacelotheca spermophora* Moesz, *Bot. Közlem.* 19: 63. 1920.

Add, under POACEAE:

Eragrostis cilianensis (*E. major*), Maryland, North Dakota.**Eragrostis minor*, Illinois.Add the exsiccati: Barth. *Fungi Columb.* 4300.13. *Ustilago Boutelouae*.

Add, under POACEAE:

Bouteloua gracilis (*B. oligostachya*), Texas.**Bouteloua hirsuta*, Texas.**Bouteloua simplex* (*B. procumbens*, *B. prostrata*), Arizona; Zacatecas.Add the exsiccati: Barth. *Fungi Columb.* 2498.13. *Ustilago Tricuspidis*.

Add, under POACEAE:

**Triodia flava* (*Tridens flavus*), Tennessee.13. *Ustilago minor*.Add the synonym: *Ustilago Hieronymi* var. *minor* Ciferri, *Trans. Brit. Myc. Soc.* 18: 262. 1934.Add the note: D. Griff. *W. Am. Fungi* 218, 219, 220, 224, 227, were erroneously issued as *Ustilago minor*. These numbers are *U. Hieronymi*, as previously pointed out under

exsiccati in N. Am. Flora 7: 14. 1906. The only available specimen of *U. minor* is in the herbarium of the Botany Department, Kansas Agricultural Experiment Station, Manhattan, Kansas.

13. *Ustilago Hieronymi*.

Add the synonym: *Ustilago Hieronymi* var. *insularis* Ciferri, Myc. Doming. Exs. 134. 1931; Ann. Myc. 31: 157. 1933. (Type from Santo Domingo, on *Bouteloua heterostega*.)

Add, under POACEAE:

Atheropogon curtispendus (*Bouteloua curtispendula*, *B. racemoso*), Colorado, Indiana, North Dakota.

Bouteloua eriopoda, New Mexico.

Bouteloua gracilis (*B. oligostachya*), Texas, Utah.

**Bouteloua heterostega*, Santo Domingo; Puerto Rico.

**Bouteloua* sp., Colorado.

Triathera aristoides (*Bouteloua aristoides*), Arizona; Sonora.

Add the exsiccati: Barth. Fungi Columb. 3397; Brenckle, Fungi Dak. 75; Sydow, Ust. 402, 429; Ciferri, Myc. Dom. Exs. 134.

Add the note: This species varies greatly on its different hosts, but the forms merge into one another; until one has them on all known localities he can not safely separate them into species and varieties, and even then it is doubtful whether he can do better than to combine them, as here, in one species. The spores are smaller (11–15 μ long) on *Bouteloua eriopoda*, while on *B. gracilis*, *B. heterostega*, *Atheropogon curtispendus*, *Triathera aristoides*, and *Dasyochloa pulchella* (*Triodia pulchella*) they vary from 12 to 21 μ . The type of the species, on *B. ciliata* from Argentina, is intermediate, 12–17 μ . In some specimens the smut is confined chiefly or entirely to the inflorescence, as shown by Griffiths' specimens (W. Am. Fungi 220 and 224) and the Kern specimen from Puerto Rico.

14. *Ustilago Buchloes*.

Add, under POACEAE:

Buchloe dactyloides (*Bulbilis dactyloides*), Colorado.

14. Insert:

33a. *Ustilago pseudohieronymi* Zundel, Mycologia 25: 351. 1933.

Ustilago coloradensis Zundel, Mycologia 25: 351. 1933. (Type from Colorado, on *Muhlenbergia gracillima*.)

Sori on the leaves and leaf-sheaths as oblong-cylindric pustules rounded at the ends, 1–5 mm. in length or by fusion longer, at first covered by the epidermis which when ruptured discloses the dark spore-mass; spores chiefly spheric to ovoid but often irregular or angular, blackish-brown, rather opaque, apparently smooth but under an immersion lens sometimes showing obscure verruculations, 14–20 μ in length.

ON POACEAE:

Bouteloua gracilis (*B. oligostachya*), Colorado.

Muhlenbergia gracillima, Colorado.

Muhlenbergia squarrosa, Colorado.

TYPE LOCALITY: San Luis Valley, Colorado, on *Muhlenbergia squarrosa*.

DISTRIBUTION: Colorado.

NOTE: This species is very similar to *Ustilago Hieronymi* and *U. Buchloes*. Zundel's *U. coloradensis* on the whole has less evident verruculations or nearly smooth and approaches nearer to those species.

33h. *Ustilago Bethelii* Zundel, Mycologia 25: 350. 1933.

Sori in the leaves as striae ranging from a few cm. long to nearly the entire length of the leaf, finally causing the leaves to become shredded, at first covered by the epidermis but when ruptured disclosing a black spore-mass; spores spheric to ovoid, regular, dark-

reddish-brown, apparently smooth but under an immersion lens granular-verruculose, chiefly 14–18 μ but sometimes 21 μ in length. (See page 1029.)

ON POACEAE:

Muhlenbergia montana, Colorado.

TYPE LOCALITY: Idaho Springs, Colorado, on *Muhlenbergia montana*.

DISTRIBUTION: Colorado.

NOTE: The spores differ from those of *Sphacelotheca montaniensis* in being larger, darker, with less evident markings and in the sori being confined to the leaves and not to the inflorescence. It differs from *Ustilago pseudohieronymi* in the sori appearing on the leaves as striae rather than as cylindric swellings and in the more regular spores.

14. *Ustilago pustulata*.

Reduce this name to synonymy and substitute: *Ustilago togata* Liro, Ann. Acad. Sci. Fenn. A. 17: 183. 1924.

Add, under POACEAE:

Panicum dichotomiflorum (*P. proliferum*), District of Columbia, Indiana, New Jersey.

Add the exsiccati: Barth. Fungi Columb. 3299.

Add the note: Winter apparently first used the specific name *Ustilago pustulata* (DC.) in 1880 (Hedwigia 19: 109) to distinguish one of the two forms of *Ustilago Bistortarum* called f. *pustulata* and f. *marginalis*, before Tracy & Earle in 1895 used this name for the smut mentioned here. The name is now used by some in Europe for the *Polygonum* smut as a distinct species called *Ustilago pustulata* (DC.) Winter; hence the name given here.

14. *Ustilago sphaerogena*.

Add, under POACEAE:

Echinochloa Crus-galli (*Panicum Crus-galli*), Colorado, Indiana, Massachusetts, Pennsylvania, Wisconsin.

Echinochloa Walteri (*Panicum Walteri*), Connecticut, Indiana.

Add the exsiccati: Barth. Fungi Columb. 4599.

14. *Ustilago Crus-galli*.

Add, under POACEAE:

Echinochloa Crus-galli (*Panicum Crus-galli*), Nevada, New York, Oklahoma, Wyoming; Quebec.

**Echinochloa frumentacea*, Connecticut.

**Echinochloa zelayensis*, New Mexico.

Add the exsiccati: Vesterg. Micr. Rar. ScI. 892.

15. *Ustilago heterogena*.

Add, under POACEAE:

**Leptochloa filiformis* (*L. mucronata*), Arizona; Sonora.

**Leptochloa viscida*, Arizona; Sonora.

15. Insert:

37a. *Ustilago esculenta* P. Henn. Hedwigia 34: 10. 1895.

Sori embedded in the hypertrophied tissues of the culms, occurring as small somewhat round or elongate sac-like cavities surrounded by a thin hyaline layer, olive-brown; spores reddish-brown, spheric to subspheric, thick-walled, smooth, chiefly 6–8 μ in diameter.

ON POACEAE:

Zizania latifolia, District of Columbia (in greenhouse).

TYPE LOCALITY: French Indo-China, on *Zizania latifolia*.

DISTRIBUTION: District of Columbia (greenhouse); French Indo-China, Formosa, and Japan.

15. *Ustilago Zeae*.

Add, under POACEAE:

Euchlaena mexicana (*E. luxurians*), District of Columbia, Indiana, New York; Dominican Republic; Durango.*Zea Mays*, Arizona, Arkansas, Colorado, Delaware, Florida, Idaho, Kentucky, Louisiana, Montana, Nevada, New Hampshire, New Mexico, North Dakota, Oregon, Tennessee, Virginia, Washington, Wyoming; Alberta, Manitoba, New Brunswick, Quebec, Saskatchewan; Bermuda, Guadeloupe, St. Croix.Add the illustration: Beitr. Krypt. Schweiz 3²: f. 15.

Add the exsiccati: Barth. Fungi Columb. 2700; Brenckle, Fungi Dak. 156.

Add the note: This smut has now been reported from all of the states, as well as from Canada, the West Indies, and Mexico.

15. *Ustilago Kellermanii*.

Add, under POACEAE:

Euchlaena mexicana (*E. luxurians*), Guatemala.Add the note: This is the second time, 1923, that this unusual smut has been reported from Guatemala on this same host; there was a question about the identity of Kellerman's collection in 1906, but this later collection removes that doubt. The collection of Ciferri from Santo Domingo, named as this species, we refer to *Ustilago Zeae*.16. *Ustilago neglecta*.

Add, under POACEAE:

Chaetochloa lutescens (*C. glauca*, *Setaria glauca*, *S. lutescens*), Colorado, Michigan, Mississippi, Missouri, North Dakota, Pennsylvania; Alberta, Manitoba, Ontario, Quebec.Add the illustration: Beitr. Krypt. Schweiz 3²: f. 14.

Add the exsiccati: Barth. Fungi Columb. 3100, 3599, 3999, 4200; Brenckle, Fungi Dak. 275.

16. *Ustilago Uniolae*.

Add, under POACEAE:

Uniola laxa (*U. gracilis*), Alabama, North Carolina.

Add the exsiccati: Barth. Fungi Columb. 2699.

16. *Ustilago ornata*.

Add, under POACEAE:

**Leptochloa unnervia* (?*L. imbricata*), Mississippi.17. *Ustilago Vilfae*.

Add, under POACEAE:

Sporobolus neglectus, Indiana, South Dakota.
Sporobolus vaginiflorus, Indiana.17. *Ustilago Rahenhorstiana*.

Add, under POACEAE:

Syntherisma filiforme (*Panicum filiforme*), Missouri.
Syntherisma sanguinale (*Panicum sanguinale*), Arkansas, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia; Ontario.
Syntherisma sp. (*Panicum* sp.), Oklahoma.

Add the exsiccati: Barth. Fungi Columb. 2297, 4099; Sydow, Ust. 455.

18. Insert:

48a. *Ustilago Schroeteriana* P. Henn. Hedwigia 35: 215. 1896.

Sori in individual spikelets usually changing into dusty dark-brown spore-masses about 1 mm. long but not completely destroying all of the floral parts; spores reddish-brown, chiefly subspheric to spheric, apparently smooth but under an oil-immersion lens minutely verruculose, chiefly 12.5–16.5 μ in length; some suggestions of hyaline, fungous cells.

ON POACEAE:

Paspalum conjugatum, Grenada.

Paspalum repens (*P. paniculatum*), Panama.

Paspalum sp., Puerto Rico.

TYPE LOCALITY: Santa Catharina, Brazil, on *Paspalum* sp.

DISTRIBUTION: Panama; Puerto Rico; Grenada; also in Brazil.

NOTE: We have compared the Panama specimen with the type material from Brazil and find them identical, with hosts probably the same. It differs from *Ustilago Holwayana* in that the sori are confined to the spikelets and have less evident markings on the spores.

18. *Ustilago Hilariae*.

Add, under POACEAE:

Hilaria mutica, New Mexico.

Add: EXSICCATI: Vesterg. Micr. Rar. Sel. 897.

18. *Ustilago Mulfordiana*.

Add, under POACEAE:

Festuca octoflora (*F. tenella*), Colorado.

Festuca sp., Quebec.

Add the exsiccati: Barth. Fungi Columb. 3298; Vesterg. Micr. Rar. Sel. 903.

18. Insert:

50a. *Ustilago Griffithsii* H. Sydow, Ann. Myc. 5: 290. JI 1907.

Ustilago Microchloae D. Griff. Bull. Torrey Club 34: 207. Ap 1907. Not *U. Microchloae* Sydow & Butler, 1906.

Sori in the inflorescence, destroying all or most of the spikelets, linear, 1.5–3 cm. long, at first hidden by enveloping leaves but eventually more exposed and showing a black dusty spore-mass, soon dissipating and leaving behind a prominent toothed columella of plant-tissues; spores reddish-black, subopaque to opaque, chiefly subspheric to spheric or somewhat compressed and so oval in side view, thick-walled, with a thin or ruptured spot in center, apparently smooth, 14–18 μ in diameter.

ON POACEAE:

Microchloa indica (*M. setacea*), Aguas Calientes, Distrito Federal, San Luis Potosí.

TYPE LOCALITY: San Luis Potosí, on *Microchloa indica*.

DISTRIBUTION: Central Mexico.

NOTE: This comes nearest, perhaps, to *Ustilago Mulfordiana*, but differs distinctly from that species in the somewhat larger smooth spores. In color and brittleness of cell-wall the spores resemble certain species of *Contractia* on the sedges. Looking at the spores as ordinarily seen in the circular outline, the wall over the center appears much thinner and so less opaque than the thick equatorial wall and often has a small ruptured area in the center. Whether this rupture is due to the fragile nature of the wall, or has to do with germination, we do not know; it suggests *Cladochytrium* or similar genera. The toothed character of the columella or rachis is due to the remains of the spikelets, which are borne in a one-sided simple spike.

50b. *Ustilago sphaerocarpa* Sydow, Ann. Myc. 15: 145. 1917.

Sori in the ovaries, evident as oblong bodies between the glumes of one or more spikelets, 3–5 mm. in length; spores rather regularly subspheric or spheric, dark-reddish-brown, opaque, apparently smooth but obscurely verruculate under an oil-immersion lens, 15–18 μ , rarely 20 μ , in diameter.

ON POACEAE:

Festuca amplissima, Distrito Federal.

TYPE LOCALITY: Popocatepetl, on *Festuca amplissima*.

DISTRIBUTION: Mexico.

NOTE: This species comes very close to *U. Mulfordiana*, but differs in somewhat larger, more irregular spores limited to the ovaries. It has more or less resemblance to a *Tilletia* type with sterile cells or immature spores.

18. *Ustilago elegans*.

Add the exsiccati: Vesterg. Micr. Rar. Sel. 893.

18. *Ustilago striaeformis*.

Add the synonyms: *Ustilago Salveii* Berk. & Br. Ann. Mag. Nat. Hist. II. 5: 463. 1850. *Ustilago Agrostis-palustris* W. H. Davis; Ciferri, Ann. Myc. 29: 54. 1931. *Ustilago Phleipratensis* W. H. Davis; Ciferri, Ann. Myc. 29: 55. 1931. *Ustilago Johnstonii* Ciferri, Nuovo Giorn. Bot. Ital. II. 40: 261. 1933.

Add, under POACEAE:

- **Agropyron pauciflorum* (*A. tenerum*), Colorado, South Dakota.
- **Agrostis exarata* (*A. microphylla*), Oregon.
- **Agrostis perennans*, Pennsylvania.
- Agrostis tenuis* (*A. alba* var. *vulgaris*), Indiana, Maryland, Massachusetts, New York, Oregon, Pennsylvania, Washington, West Virginia, Wisconsin; British Columbia.
- **Beckmannia Syzigachne* (*B. eruciformis*), Alberta, Manitoba.
- **Bromus secalinus*, Illinois.
- **Dactylis glomerata*, Massachusetts, Pennsylvania, Tennessee, West Virginia.
- **Elymus canadensis*, Missouri.
- Elymus canadensis* var. *glaucofolius*, Minnesota.
- **Elymus glaucus*, Utah.
- **Elymus Macounii*, South Dakota.
- **Elymus striatus*, Illinois.
- **Elymus triticoides*, Nevada.
- Elymus virginicus*, Indiana, Iowa.
- **Elymus* sp., Idaho.
- **Festuca elatior*, Illinois.
- Festuca obtusa* (*F. nutans*), Iowa, Maryland.
- **Festuca ovina*, North Dakota.
- **Festuca saximontana*, Colorado.
- **Holcus lanatus*, California, Oregon.
- **Hordeum jubatum*, South Dakota.
- **Hystrix patula* (*H. Hystrix*), Kansas (type of *U. Johnstonii*).
- **Lolium perenne*, Oregon.
- **Phalaris arundinacea*, Maine.
- Phleum pratense*, Connecticut, Idaho, Kentucky, Maryland, Michigan, Montana, North Dakota, Oregon, Pennsylvania, Washington, West Virginia; Ontario.
- **Poa compressa*, California, Indiana, West Virginia.
- **Poa palustris* (*P. triflora*), South Dakota.
- Poa pratensis*, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, New York, Pennsylvania, Virginia, West Virginia, Wisconsin.
- **Poa trivialis*, Connecticut.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 19.

Add the exsiccati: Barth. Fungi Columb. 3300; Brenckle, Fungi Dak. 499, 499a, 597, 598, 599, 600; Vesterg. Micr. Rar. Sel. 904.

Add the note: Species-makers have begun to split this species into species and forms based on the host-genus or host-species, and in some cases even splitting these further. This complicated treatment of species, which can only be determined if one knows the host or the locality from which it came, greatly and unnecessarily adds to the synonymy.

19. *Ustilago Calamagrostidis*.

Add, under POACEAE:

Calamagrostis canadensis, Indiana, Wisconsin; Alberta.

19. *Ustilago macrospora*.

Add, under POACEAE:

- **Agropyron pauciflorum* (*A. tenerum*), Utah.
- Agropyron repens*, Minnesota.
- **Bromus inermis*, Iowa.
- **Elymus canadensis*, Colorado, Nebraska, South Dakota.
- **Elymus glaucus*, Utah.
- **Elymus robustus*, Utah.
- **Elymus virginicus* var. *intermedius* (*E. virginicus* var. *hirsutiglumis*), Missouri.

Add the exsiccati: Brenckle, Fungi Dak. 624.

20. *Ustilago echinata*.

Add, under POACEAE:

Phalaris arundinacea, Michigan, South Dakota.

Add: EXSICCATI: Brenckle, Fungi Dak. 595.

20. *Ustilago Arthuri*.

Add, under POACEAE:

Fluminea festucacea (*Scolochloa festucacea*), South Dakota.

Add the exsiccati: Brenckle, Fungi Dak. 594.

20. Insert:

57a. *Ustilago Vuijckii* Oud. & Beijer.; Oud. Versl. Akad. Amst. IV. 3: 55. 1895.*Cintractia Vuijckii* Ciferri, Ann. Myc. 29: 72. 1931.

Sori completely hidden in ovaries, the spore-mass, on dehiscence of the capsule, escaping between the valves and showing as a dusty yellowish powder, apparently incompletely filling it; spores spheric, hyaline, yellowish or eventually light-yellowish-brown, reticulate (the polygonal meshes 2-3 μ), but on margin and young spores appearing as coarse tubercles projecting 1.5-2 μ beyond the cell-wall, chiefly 15-18 μ in diameter.

ON JUNCACEAE:

Lucula glabrata (*Juncooides glabratum*), Washington (Mt. Rainier Meadows).TYPE LOCALITY: Voorschoten, Holland, on *Lucula campestris*.

DISTRIBUTION: Washington; also in Europe.

ILLUSTRATION: Ann. Acad. Sci. Fenn. A. 17: 519, f. 9.

NOTE: This smut agrees with the specimen originally described from Holland on *Lucula campestris* and since reported from several European countries on this host and other species of *Lucula*. Usually mixed with and adhering to the spores or in masses, one finds numerous minute sporidium-like hyaline bodies probably budding yeast-fashion; whether these are connected with the spores in any way I do not know. They sometimes appear to be broken off tubercle-like projections, but are not.

Not reported before from America. If the germination had not been given in the original description as producing lateral as well as terminal sporidia, I should say from appearances that this was a *Tilletia* instead of a *Ustilago*. The specific name is variously spelled by different authors. Sydow (Bot. Jahresb. 22: 84. 1894) says it was described as occurring in anthers and ovaries; he also says it is distinct from *Ustilago capensis* Reess, which seems to be the only species with which it might be confused.

20. *Ustilago Heufleri*.

Add, under LILIACEAE:

Erythronium albidum*, Missouri.*Erythronium americanum*, Connecticut, Delaware, District of Columbia, Maryland, Massachusetts; Quebec.Erythronium* sp., Ohio.20. *Ustilago Vaillantii*.

Add, under LILIACEAE:

**Muscari comosa*, Massachusetts.Add the illustration: Beitr. Krypt. Schweiz 3²: f. 10.20. *Ustilago Oxalidis*.

Add, under OXALIDACEAE:

**Oxalis corniculata*, New York, Pennsylvania, West Virginia.*Oxalis stricta* (may include other species), Indiana, Nebraska, New Jersey, North Carolina, Pennsylvania, South Carolina, South Dakota, Texas.

Add the exsiccati: Barth. Fungi Columb. 2499; Brenckle, Fungi Dak. 596.

21. *Ustilago vinosa*.Add the illustration: Beitr. Krypt. Schweiz 3²: f. 20.

21. *Ustilago violacea*.

Add, under CARYOPHYLLACEAE:

- **Dianthus Caryophyllus*, Ontario.
- Moehringia lateriflora* (*Arenaria lateriflora*), Utah.
- **Silene caroliniana* (*S. pennsylvanica*), New York, Virginia.
- Silene Lyallii*, Wyoming.
- **Silene oregana*, Washington.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 26.

21. Insert:

62a. *Ustilago Clintoniana* Ciferri, Ann. Myc. 26: 64. 1928.*Ustilago violacea* var. *major* Clinton, Jour. Myc. 8: 139. 1902. (Described under this name on page 21.)62b. *Ustilago Alsineae* Clinton & Zundel, sp. nov.

Sori in the ovaries, but apparently confined to the ovules, ovoid to ellipsoid and about 2 or 3 mm. in length, dehiscing peculiarly and disclosing dusty purple-black spore-masses in place of the seeds; spores dark-purple, often subopaque, subspheric to spheric, with obscure very minute and shallow reticulations (about 1 μ in diameter), showing at the margin as rather inconspicuous papillae, chiefly 10-14 μ in diameter. (See page 1029.)

ON CARYOPHYLLACEAE:

- Alsine nitens*, Washington (not *Ustilago violacea* as reported).
- Alsine praecox*, Idaho.

Type collected at Falk's Store, Idaho, April 22, 1911, on *Alsine praecox* (*Stellaria praecox*) A. Nelson.

DISTRIBUTION: Idaho and Washington.

NOTE: If *Ustilago Duriaea* Tul. on *Cerastium* and *Arenaria*, and *Ustilago Holostei* DeBary on *Holosteum* are distinct species, then the above is also distinct, as it differs from either of them more than they do from each other. Yet these three seed-inhabiting species are certainly very closely related, and the slight differences may even be due to the hosts. Our species differs decidedly from *U. Duriaea*, but perhaps less decidedly from *U. Holostei*, in its dark or black-purple spores, while these other species in all of the specimens examined have lighter reddish-purple spores. Its spores also, on the whole, are smaller, more regular, and with more minute reticulations that extend out at the margins as inconspicuous papillae rather than as wings, especially as compared with *U. Holostei*. It is entirely distinct from *Ustilago violacea* and its related forms that occur in the anthers of similar hosts. Nelson writes: "I find that we have abandoned *S. praecox* as a species, reaching the conclusion that its peculiarities represented abnormalities due to seed-infection."

62c. *Ustilago Duriaea* Tul. Ann. Sci. Nat. III. 7: 105. 1847.

Sori in the ovary, destroying the ovules and funiculi and possibly the placenta, showing as a dusty or agglutinated, purplish spore-mass; spores light-purple to dark-purple, chiefly subspheric to spheric, with evident small to medium reticulations showing somewhat winged at margins, 10-15 μ in diameter.

ON CARYOPHYLLACEAE:

- Cerastium viscosum*, Oregon.

TYPE LOCALITY: Mauritania, Africa, on *Cerastium glomeratum*.

DISTRIBUTION: Northwestern United States; also in Europe and Africa.

ILLUSTRATIONS. Ann. Sci. Nat. III. 7: pl. 5, f. 32; Bref. Unters. Gesammt. Myk. 12: pl. 8, f. 35; Verh. Zool.-Bot. Ges. Wien 46: pl. 7, f. 6-17.

NOTE: This species differs from *Ustilago Alsineae* in its lighter-colored spores and more evident winged reticulations. Our Oregon specimen (in Zundel Herbarium), while meager and past its prime, agrees with European specimens on *Cerastium semidecandrum*.21. *Ustilago Gayophyti*.

Add, under ONAGRACEAE:

- **Gayophytum intermedium*, Utah.

21. Insert:

63a. *Ustilago Claytoniae* Shear, Bull. Torrey Club 34: 317. 1907.

Sori in the seeds, concealed at first by the ovary, which on splitting open show one or more ellipsoid, semi-agglutinated to dusty, purple-black spore-masses, about 1 mm. in

diameter; spores ellipsoid or ovoid to chiefly subspheric or spheric, dark-purple, with minute mostly regular reticulations (1 or 2 μ) showing on the margin as more or less conspicuous coarse-ribbed wings, 12-16 μ , rarely 18 μ in length.

ON PORTULACACEAE:

Claytonia linearis, Washington.

TYPE LOCALITY: Vancouver Barracks, Washington, on *Claytonia linearis*.

DISTRIBUTION: Washington.

NOTE: This lies between *Ustilago Gayophyti* and *U. Calandriniae*, and is not very different from the latter. Further study may show they are the same.

22. *Ustilago Calandriniae*.

Add, under PORTULACACEAE:

**Oreobromo nevadense* (*Calandrinia nevadensis*, *Lewisia nevadensis*), California. (On this specimen the reticulations do not project quite as far as on some of the other specimens.)

22. *Ustilago anomala*.

Add, under POLYGONACEAE:

Bilderdykia cilinodis (*Tiniaria cilinodis*, *Polygonum cilinode*), Connecticut, Massachusetts, Pennsylvania; Manitoba, Ontario.

Bilderdykia Convolvulus (*Tiniaria Convolvulus*, *Polygonum Convolvulus*), South Dakota; Alberta, Ontario.

**Bilderdykia dumetorum* (*Tiniaria dumetorum*, *Polygonum dumetorum*), Pennsylvania.

Bilderdykia scandens (*Tiniaria scandens*, *Polygonum scandens*), New Jersey, New York.

**Tovara virginiana* (*Polygonum virginianum*), Quebec.

22. *Ustilago utriculosa*.

Add, under POLYGONACEAE:

Persicaria Carey (*Polygonum Carey*), Wisconsin.

Persicaria Hydropiper (*Polygonum Hydropiper*), Maryland, Massachusetts.

Persicaria hydropiperoides (*Polygonum hydropiperoides*), Indiana, Washington; Nova Scotia.

Persicaria lapathifolia (*Polygonum lapathifolium*), Indiana, Maryland, Michigan, Missouri, North Dakota, Pennsylvania; Alberta, Manitoba, Nova Scotia, Quebec.

**Persicaria mitis* (*P. Persicaria*, *Polygonum Persicaria*), Indiana, Iowa, Minnesota, Oregon; Ontario.

**Persicaria Muhlenbergii* (*Polygonum Muhlenbergii*, *P. emersum*), Florida.

Persicaria pennsylvanica (*Polygonum pennsylvanicum*), Florida, Indiana, Maryland, Pennsylvania, Virginia, Wisconsin; New Brunswick.

Persicaria punctata (*Polygonum punctatum*, *P. acre*), Delaware, Michigan.

Persicaria sp. (*Polygonum* sp.), Oregon, Texas; Canada.

Traucalon sagittatum (*Polygonum sagittatum*), Nova Scotia.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 31.

Add the exsiccati: Barth. Fungi Columb. 2298, 2600; Brenckle, Fungi Dak. 550; Sydow, Ust. 408.

23. *Ustilago Rumicis*.

Add, under POLYGONACEAE:

Rumex hastatus, Florida. (In this specimen the sori occur in the leaves and stems as well as in the inflorescence, so there is some question whether *Ustilago Rumicis* is really distinct from *U. Parlatorei*.)

23. *Ustilago Parlatorei*.

Insert: ILLUSTRATION: Beitr. Krypt. Schweiz 3²: f. 22.

23. *Ustilago Piperii*.

Add, under POLYGONACEAE:

**Polygonum* sp., Nevada.

23. *Ustilago punctata*.

Add, under POLYGONACEAE:

**Aconogonum phytolaccaefolium* (*Polygonum alpinum*), Oregon, California.

Add the note: *Sphacelotheca alpinum* Schellenb. is apparently very close to this species. The Oregon specimen has sori on both the inflorescence and the leaves, and the California one on the leaves and apparently in the aborted inflorescence. There seems to be no reason for considering the American specimens a *Sphacelotheca*.

24. *Ustilago Bistortarum*.

Add the synonyms: *Ustilago marginalis* Lév. Dict. Univ. Hist. Nat. 12: 778. 1848. *Ustilago pustulata** (Wint. Hedwigia 19: 109; hyponym. 1880). Bubák; Vesterg. Micr. Rar. Sel. 336. 1900. (Houby České 2: 17. 1912.)

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 18; Arch. Nat. Land. Böhmen 15³: f. 8.

24. Insert the excluded species:

Ustilago Festucae Zundel, Mycologia 25: 352. 1933. On *Festuca Kingii*. Further study has shown this species to be *Ustilago perennans* on *Arrhenatherum elatius*.

24. Insert:

1a. **FARYSIA** Racib. Bull. Acad. Cracovie 1909¹: 354. 1909.

Elateromyces Bubák, Houby České 2: 32. 1912.

Sori in various parts of the host, at maturity forming dusty, usually dark spore-masses, intermixed with parallel, elatior-like strands of host-tissue and sterile hyphae; spores single, produced as in *Ustilago* but intermixed with sterile hyphae and strands of host-tissue which function as elaters.

Type, *Ustilago javanica* Racib.

1. **Farysia olivacea** (DC.) Sydow, Ann. Myc. 17: 41. 1919.

Uredo olivacea DC. Fl. Fr. 6: 78. 1815.

Caeoma olivaceum Schlecht. Fl. Berol. 2: 130. 1824.

Erysibe olivacea Wallr. Fl. Crypt. Germ. 2: 215. 1833.

Ustilago olivacea Tul. Ann. Sci. Nat. III. 7: 88. 1847.

Ustilago calenata F. Ludwig, Zeits. Pflanzenkr. 3: 139. 1893.

Cintractia caricicola P. Henn. Hedwigia 34: 325. 1895.

Ustilago subolivacea P. Henn. Atti Ist. Bot. Roma 6: 84. 1896.

Ustilago caricicola Tracy & Earle, Bull. Torrey Club 26: 493. 1899.

Elateromyces olivacea Bubák, Houby České 2: 32. 1912.

Stilbella olivacea Jaap, Ann. Myc. 14: 43. 1916.

Farysia olivacea Höhnelt, Ann. Myc. 15: 293. 1917.

Farysia americana Ciferri, Ann. Myc. 29: 73. 1931.

Sori in occasional ovaries, at first partly concealed by perigynium, ovate, 2-6 mm. in diameter, at first with agglutinated spores which later become powdery, with conspicuous elater-like threads intermixed with the spores; spores olivaceous-brown, irregular, varying from globose to oblong or linear but sometimes more regular and then 7-9 μ in length, the most elongate about 12 μ in length and about 4 μ in width, abundantly but minutely verruculate.

ON CYPERACEAE:

Carex lonchocarpa (*C. folliculata* var. *australis*), Mississippi.

Carex polystachya (*C. cladostachya*), Mexico.

**Carex Pseudo-Cyperus*, Santo Domingo.

**Carex rostrata* (*C. utriculata*), California, Pennsylvania, Washington, Wisconsin.

Carex turgescens, Florida.

Carex sp., Guatemala; Mexico; Jamaica.

* Winter, although he mentioned this name, did not consider it as distinct from *U. Bistortarum*, but Bubák did. See note under *Ustilago togata* (*U. pustulata*), page 986.

TYPE LOCALITY: France, on *Carex riparia*.
 DISTRIBUTION: Pennsylvania to Washington; Mexico; Guatemala; Jamaica; Santo Domingo; also in South America, Europe, and Asia.
 ILLUSTRATIONS: Bref. Unters. Gesamt. Myk. 5: pl. 10, f. 9-26; Bull. Soc. Nat. Mosc. 40: pl. 3, f. 11.

25. *Sphacelotheca Sorghi*.

Add to description: sterile membrane breaking up into chains of small hyaline sterile cells.

Add, under POACEAE:

- Sorghum halepense*, Arkansas, Texas, Utah.
- **Sorghum sudanense*, Iowa, Kansas, Washington.
- Sorghum vulgare*, Colorado, Georgia, Indiana, Maryland, Mississippi, Missouri, Montana, New Mexico, North Carolina, North Dakota, Oregon, Pennsylvania, Tennessee, Texas, Utah, Virginia, Washington; Manitoba; Puerto Rico.
- **Sorghum vulgare* var. *caffrorum*, Connecticut, Pennsylvania; Quebec.
- **Sorghum vulgare* var. *Durra*, Kansas, Virginia.
- **Sorghum vulgare* var. *Roxburghii*, Texas.
- **Sorghum vulgare* var. *saccharatum*, Colorado, Connecticut, Utah.
- **Sorghum vulgare* var. *technicum*, Connecticut, District of Columbia, Pennsylvania, Washington; Ontario.
- **Sorghum* sp., Arizona.

25. Insert:

1a. *Sphacelotheca cruenta* (Kühn) A. Potter, *Phytopathology* 2: 98. 1912.

Ustilago cruenta Kühn, *Hamb. Gartenz.* 28: 178. 1872.

Sori confined mostly to the ovaries, ovate, about the size of the normal mature seed, covered by a very delicate membrane which easily ruptures revealing a dark-brown dusty spore-mass surrounding a well-developed columella; sterile cells of membrane breaking up into groups, large, thin-walled, ovoid, hyaline, 9-19 μ in length; spores olivaceous-brown, spheric to ovoid, slightly irregular, somewhat granular, chiefly 5.5-8 μ in length.

ON POACEAE:

Sorghum vulgare, Arkansas, Kansas, Oklahoma, Tennessee, Texas, Wisconsin; Cuba, Haiti, Jamaica.

DISTRIBUTION: Arkansas to Wisconsin and the West Indies; also in Europe.

ILLUSTRATIONS: *Jour. Agr. Res.* 2: pl. 32, f. 1a; *Phytopathology* 5: pl. 10, f. 1-4.

25. *Sphacelotheca Seymouriana*.

Add, under POACEAE:

- **Andropogon ternarius*, Georgia, North Carolina, Virginia.
- **Schizachyrium scoparium* (*Andropogon scoparius*), Virginia.

26. *Sphacelotheca monilifera*.

Add, under POACEAE:

- **Andropogon glomeratus*, Virginia.

27. *Sphacelotheca diplospora* var. *verruculosa*.

Add, under POACEAE:

- **Brachiaria Meziana*, Distrito Federal. (This host appears to be the same as the type host.)

27. Insert:

6a. *Sphacelotheca veracruziana* Zundel & Dunlap, sp. nov.

Sori filling the ovaries, ovoid, chiefly 1-2 mm. in diameter, covered with a prominent thick false irregularly dehiscent membrane; spore-mass powdery, black-brown, surrounding a large globose columella; sterile cells of membrane variable in shape and size, firmly adhering together, the cells of the interior often in pairs, hyaline, thick-walled, angular, subspheric, smaller than the spores; spores with a tendency to agglutinate, reddish-brown, ovoid to ellipsoid, coarsely verruculose, chiefly 8-13 μ in length. (See page 1029.)

ON POACEAE:

Panicum viscidellum, Vera Cruz.

Type collected at Jalapa, Vera Cruz, at an altitude of about 1400 meters, on *Panicum viscidellum*, September 2-4, 1910, by A. S. Hitchcock (no. 6606).

DISTRIBUTION: Mexico.

27. *Sphacelotheca pamparum*.

Add, under POACEAE:

**Chaetochloa geniculata* (*Setaria geniculata*), Bermuda.

Add the note: Ciferri (Trans. Brit. Myc. Soc. 18: 262-263. 1934) states that this smut is identical with *Tilletia Magnusiana* Fisch. de Waldh., but transfers it to *Sphacelotheca Magnusiana* (Fisch. de Waldh.) Ciferri. Seymour (Farl. & Seym. Host-Index N. Am. Fungi 94) lists *Tilletia Magnusiana* Fisch. de Waldh. on ? *Panicum geniculatum*. The authors have accepted these identifications but they have seen no specimens of this smut from North America, nor other evidence to verify the above statements.

27. Insert:

7a. *Sphacelotheca Penniseti-japonici* (P. Henn.) S. Ito, Trans. Sapporo Nat. Hist. Soc. 14: 91. 1935.

Ustilago Penniseti-japonici P. Henn. Hedwigia 43: 140. 1904.

Sori in the ovaries of all the spikelets, forming linear bodies extending between the glumes, about 6-10 mm. in length, rupturing from apex and with the gradual flaking away of the false membrane and semi-agglutinated black-brown spore-mass disclosing a distinct columella, often breaking up into four slender rigid threads; false membrane rather permanently united at base but finally separating into slender hyaline threads composed of oblong cells, often guttulate and narrower than the spores; spores reddish-brown, distinctly granular-verruculose, subspheric to spheric, or occasionally more elongate and angular, 10-15 μ in length.

ON POACEAE:

Pennisetum olopecuroides (*P. japonicum*), Virginia.

TYPE LOCALITY: Tokyo, Japan, on *Pennisetum japonicum*.

DISTRIBUTION: Virginia; also in Asia.

NOTE: Reported from this country only from Arlington Farm of the United States Department of Agriculture on a collection made by C. V. Piper, October 11, 1915. Although closely related to *Ustilago Penniseti* Rab., it differs in the slightly larger spores which are distinctly granular-verruculose. It is even more closely related to, if not identical with, *Ustilago Pappiana* Bacc., which despite the original description has spores granular-verruculose under an immersion-lens though the sorus seems to be shorter and more globose. *Ustilago Schefferi* Sydow is also closely related but infects the entire inflorescence. All four smuts have *Pennisetum* species for their hosts and at least *U. Pappiana* and *U. Penniseti* seem to be species of *Sphacelotheca*. We have not seen *Ustilago kamerunensis* Sydow also on *Pennisetum*, but the spores are described as considerably smaller, 6-8 μ . *Tolyposporium Pennicillariae* Bref. on *Pennisetum* (*Pennicillaria*) is quite distinct.

27. *Sphacelotheca occidentalis*.

Add, under POACEAE:

Andropogon furcatus, Colorado, Indiana, Oklahoma, South Dakota; Manitoba.

Andropogon Hallii, North Dakota.

**Schizachyrium scoparium* (*Andropogon scoparius*), Virginia.

**Sorghum vulgare*, Haiti.

Add the exsiccata: Barth. Fungi Columb. 3388; Brenckle, Fungi Dak. 421.

27. Insert:

8a. *Sphacelotheca panamensis* Zundel & Dunlap, sp. nov.

Sori in the ovaries, slightly shorter than and hidden by enveloping glumes, about 3 mm in length, linear, at first covered by a definite false membrane which disappears, disclosing the dusty spore-mass and finally the slender-pointed columella; sterile membrane rather loosely bound together, easily separating into subspheric or spheric hyaline cells about the same size as the spores or slightly larger; spores reddish-brown, thin-walled,

rather regular, chiefly subspheric or spheric, apparently smooth but under an immersion-lens, at least at times, minutely granular, 14–18 μ in diameter. (See page 1029.)

ON POACEAE:

Cymbopogon sp., Panama.

Type collected near El Bogrete, Prov. Chérique, Panama, September–October 1911, by A. S. Hitchcock.

NOTE: The meager type specimen was labeled "*Ustilago spermoidea* Berk. & Br.?" by Diehl, but it does not agree with that species, which is also a *Sphacelotheca*, or with any of the smuts we have seen so far on either *Cymbopogon* or *Andropogon*. Both the large regular spores and the sori combined with the ovaries distinguish it from these species. (U. S. Nat. Herb. 925602.) The description was written by Dr. Clinton, without a specific name.

27. *Sphacelotheca Ischaemi*.

Add, under POACEAE:

**Andropogon barbinodis*, Aguas Calientes, Chihuahua, San Luis Potosí.

Andropogon furcatus, South Dakota, Tennessee.

**Andropogon pertusus* var. *panormitanus*, St. Croix; Barbados.

Andropogon saccharoides, Arizona, California (Santa Catalina Island).

**Andropogon* sp., North Carolina.

Schizachyrium scoparium (*Andropogon scoparius*), New Jersey, Virginia.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 33.

Add the note: Part of the specimens on *Andropogon barbinodis* involve the entire inflorescence, forming the normal linear sori, and others only partially destroy it, sometimes being confined to the individual spikelets and forming more irregular or shorter and broader sori. The collection from Aguas Calientes was unusual in that the packet contained not only this species but also *Sphacelotheca Andropogonis-hirtifolii* (P. Henn.) Clinton, distinguishable by the larger spores with more evident verruculations under an immersion-lens. That the two species are closely related and difficult to distinguish (and yet they seem quite distinct when the spores are mixed together on a slide under the microscope) is shown by both species having not only this host but also *Andropogon saccharoides*, if these hosts have been correctly determined. The specimen on the latter host listed from Arizona in our monograph of Ustilaginales, under *S. Andropogonis-hirtifolii*, we have now decided belongs here, though the two specimens from Mexico on the same host do not.

28. Insert:

9a. *Sphacelotheca erythraeensis* (Sydow) Clinton.

Ustilago erythraeensis Sydow, Ann. Myc. 9: 144. 1911.

Sori in the inflorescence, not wholly hidden by the enveloping leaf-sheaths, oblong-linear, about 1 cm. in length, protected by a definite false membrane which breaks away from the top disclosing the brown-black semi-agglutinated or dusty spore-mass and finally the distinct columella of plant-tissue; sterile cells scattered somewhat in subspheric groups within the spore-mass, those of the false membrane cohering rather permanently or separating somewhat upon pressure into threads of two to several cells in a row, hyaline, subspheric, about the size of the spores; spores chiefly subspheric or spheric, light-reddish-brown, when young apparently smooth but with age distinctly minutely-verruclose, 10–12 μ in diameter.

ON POACEAE:

Hackelochloa granularis (*Manisuris granularis*), Arizona; Guerrero.

TYPE LOCALITY: Eritrea, northern Africa.

DISTRIBUTION: Arizona; Guerrero; also northern Africa.

NOTE: This species, collected first by Griffith & Thornber in Arizona, and later by Hitchcock in Balsas, Guerrero, Mexico, agrees with specimens of Sydow's *Ustilago erythraeensis* as issued in his Ustilagineae (451), though the spore-measurements given in his description are slightly smaller than we make them from his own specimen. The American specimens are younger and the spores are therefore apparently smooth though the verruculations can be seen indistinctly with an immersion-lens. Hitchcock in his Mexican grasses places this host under the genus *Rytidix*. The evident false-membrane, with the distinct sterile cells within the spore-mass, places the fungus, under our system, in the genus *Sphacelotheca*, to which we have transferred it here.

9b. *Sphacelotheca culmiperda* (Schroet.) Clinton; Zundel, *Mycologia* 22: 143.
1930.

Ustilago culmiperda Schroet.; P. Henn. *Hedwigia* 35: 212. 1896.

Sori in the inflorescence, entirely aborting it and so appearing as if on the stem, at first enclosed in the leaf-sheaths but finally more or less exposed, showing as linear bodies 2-5 cm. in length, protected by a prominent light-colored false-membrane which gradually wears away revealing a black dusty spore-mass that becomes dissipated and leaves behind only a prominent columella of plant-tissues; sterile cells of membrane cohering rather permanently but upon pressure separating somewhat into threads, cubic to more elongate and often somewhat rounded at the ends, eventually semigelatinized, smaller than the spores; spores dark-reddish-brown, subopaque, chiefly subspheric to spheric, regular though often cupped on one side, and so somewhat flattened-elliptic in side view, with apparently smooth wall (about $1\ \mu$ thick) but under an immersion-lens minutely granular-verruculate, chiefly $15-18\ \mu$ or rarely $14-21\ \mu$ in diameter.

ON POACEAE:

Andropogon bicornis, Vera Cruz.

TYPE LOCALITY: Joinville, Santa Catharina, Brazil.

DISTRIBUTION: Vera Cruz; also in Brazil.

NOTE: The specimen from Mexico is entirely distinct from *Ustilago bicornis* P. Henn. on the same host from Brazil. It does agree, however, with *Ustilago culmiperda* Schroet. as described by Hennings, which was also on this host from Brazil, and with the co-type specimen collected by Ule. We could find no evidence in either of these mature specimens that the spores are formed in balls, as in *Sorosporium*, and we have no hesitation in placing it in the genus *Sphacelotheca* because of the prominent false membrane. It has the largest spores of any of our species, so far placed under this genus. It is very close to if not identical with *Sphacelotheca (Ustilago) leucostachys* P. Henn. on *A. leucostachys*, but differs in being granular-verruculate instead of apparently smooth under an immersion-lens.

9c. *Sphacelotheca Kellermanii* Clinton & Zundel; Zundel, *Mycologia* 22: 142.
1930.

Sori in the inflorescence, bunched and forming witches-broom effect, but individual sori linear elongate, usually 2-4 cm. in length; sterile membrane conspicuous, breaking irregularly into elongate strips (disclosing dusty spore-mass and eventually the elongate recurved columella of plant-tissues) but not separating easily into the individual cells (hyaline to reddish-brown tinted), these chiefly oblong to cubic and smaller than the spores; spores dark-reddish-brown, subopaque, angular, irregularly oblong to subspheric, distinctly granular-verruculate under an immersion-lens, $10-16\ \mu$, rarely $18-20\ \mu$ in length.

ON POACEAE:

Andropogon leucostachys, Guatemala.

TYPE LOCALITY: Los Amates, Guatemala, on *Andropogon leucostachys*.

DISTRIBUTION: Guatemala.

NOTE: This species is closely related to *Sphacelotheca Holwayi* Clinton & Zundel (Bolivia) on *Andropogon bicornis*, but differs in the occasionally more elongate spores and in the more evident granular-verruculations. It is even more distinct from *Sphacelotheca (Ustilago) leucostachys* on the same host since the latter has quite regular, subspheric, larger spores and a simple sorus. This description is based on three collections made by W. A. Kellerman in Los Amates, Guatemala, March 15, 1905, and January 15 and February 15, 1908. The host was determined by Agnes Chase.

28. *Sphacelotheca Paspali-notati*.

Add, under POACEAE:

**Paspalum* sp., Puerto Rico.

28. Insert:

10a. *Sphacelotheca Panici-miliacei* (Pers.) Bubák, *Houby České* 2: 27.
1912.

Uredo (Ustilago) segetum var. *Panici-miliacei* Pers. *Syn. Fung.* 224. 1801.

Uredo (Ustilago) segetum var. *Panici* Alb. & Schw. *Consp. Fung.* 130. 1805.

Uredo carbo var. *Panici-miliacei* DC. *Fl. Fr.* 6: 76. 1815.

Caecoma destruens Schlecht. *Fl. Berol.* 2: 130. 1824.

Uredo destruens Duby, *Bot. Gall.* 901. 1830.

- Erysibe Panicorum* var. *Panici-miliacei* Wallr. Fl. Crypt. Germ. 2: 216. 1833.
Ustilago Carbo var. *destruens* Tul. Ann. Sci. Nat. III. 7: 81. 1847.
Tilletia destruens Lév. Ann. Sci. Nat. III. 8: 372. 1847.
Ustilago destruens Schlecht.; Rab. in Klotzsch, Herb. Viv. Myc. ed. 2. 400. 1856.
Ustilago Panici-miliacei Wint. in Rab. Krypt.-Fl. I: 89. 1884.
Sorosporium Panici-miliacei Tak. Bot. Mag. Tokyo 16: (247). 1902.

Sori in the inflorescence, completely destroying it, at first concealed by leaf-sheaths but eventually more or less exposed, about 3-6 cm. in length by 0.5-2 cm. in width, with an evident whitish false membrane that gradually flakes away revealing a dusty black-brown spore-mass and numerous strands of plant-tissue; sterile cells of false membrane cohering rather firmly, hyaline, angular, usually mostly elongate with the shorter diameter smaller than the spores; spores light-reddish-brown, broadly ovate to chiefly subspheric or spheric, usually smooth, chiefly 7-10 μ in length, or rarely longer.

ON POACEAE:

Panicum miliaceum, Colorado, North Dakota, Oregon, Washington, Wisconsin; Manitoba, Ontario, Saskatchewan, Quebec.

TYPE LOCALITY: Europe, on *Panicum miliaceum*.

DISTRIBUTION: Western United States and western Canada; Ontario and Quebec; Europe, Asia, Tripoli, Australia, and Philippine Islands.

ILLUSTRATION: Arch. Nat. Land. Böhmen 15³: f. 11.

EXSICCATI: Brenckle, Fungi Dak. 91.

NOTE: We find some variations in the size and markings of certain specimens on this host from America; at first this led us to place some of them under *Sorosporium Syntherismae*, which it very closely resembles. But upon further examination we found it difficult to draw the deciding line, and in the end we placed them all together here. The abnormal specimens usually have larger more irregular spores and under an immersion-lens often show more or less evident indications of verruculations in their walls.

10b. *Sphacelotheca Digitariae* (Kunze) Clinton.

- Uredo Digitariae* Kunze; Holl, Flora 13: 369. 1830.
Ustilago Digitariae f. *Panici-repentis* Kühn, Hedwigia 15: 5. 1876. (Rab. Fungi Eur. 2090, f. 11.)
Ustilago pallida Körn. Hedwigia 16: 34. 1877.
Ustilago Digitariae Wint. in Rab. Krypt.-Fl. 1¹: 88. 1881.

Sori in the inflorescence, protruding more or less from the leaf-sheaths as elongate bodies 4-8 cm. in length, covered at first by the false membrane, which soon flakes away revealing a dark-brown dusty spore-mass and numerous elongate shreds of plant-tissues; sterile cells cohering rather permanently, hyaline, cubic to elongate, sometimes slightly rounded and with their shorter diameter about the diameter of the spores; spores light-reddish-brown, subspheric, or occasionally more irregular or elongate, smooth, chiefly 6-8 μ or rarely 5-9 μ in diameter.

ON POACEAE:

Syntherisma (Digitaria) sp., Mexico; Jamaica.

TYPE LOCALITY: Near Triest, Italy, on *Digitaria sanguinalis*.

DISTRIBUTION: Europe, India, Egypt, Mexico (Mexican specimen collected at Popo Park, Mexico (state), August 4-8, 1910, by A. S. Hitchcock).

ILLUSTRATION: Beitr. Krypt. Schweiz 3²: f. 7.

NOTE 1: Specimens labeled *Ustilago Digitariae* in Rab. Fungi Eur. 2094 and Thüm. Myc. Univ. 1419 are not this species but *Ustilago Rabenhorstiana*.

NOTE 2: Körnicke speaks of the panicles as sometimes being only partially destroyed and bearing spikelets but in none of the specimens seen by us was this the case. This fungus differs distinctly from *Ustilago Rabenhorstiana* on the same hosts, in the smaller smooth spores and the presence of the false membrane, which, in our treatment of the smuts, places it in the genus *Sphacelotheca*. It is very closely related, however, to *Sphacelotheca (Ustilago) Panici-miliacei* and *S. Panici-leucophaei*, being perhaps intermediate and hardly to be told from them by the spore-characters. In young stages, the spores often adhere loosely in irregular clusters but not in such a definite manner as to place it under *Sorosporium*.

28. *Sphacelotheca Panici-leucophaei*.

Reduce this name to synonymy, and substitute: *Sphacelotheca cordobensis* (Speg.) H. S. Jackson, Jour. Dep. Agr. P. Rico 14: 298. O 1930.

Add the synonyms: *Ustilago cordobensis* Speg. Anal. Soc. Ci. Argent. 12: 64. 1881.
Ustilago cacheutensis Speg. Anal. Mus. Nac. Buenos Aires III. 12: 293. 1909. *Sphacelotheca cordobensis* Ciferri, Ark. Bot. 23A¹⁴: 16. 1931.

Add, under POACEAE:

Trichachne insularis (*Panicum leucophaeum*), Santo Domingo and Haiti; Martinique.

Add the exsiccati: Ciferri, Myc. Doming. Exs. 2.

28. *Sphacelotheca Andropogonis-hirtifolii*.

Add, under POACEAE:

**Andropogon barbinodis*, Aguas Calientes.

29. *Sphacelotheca montaniensis*.

Add, under POACEAE:

Muhlenbergia racemosa (*M. glomerata*), North Dakota.

Add the exsiccati: Brenckle, Fungi Dak. 190; Sydow, Ust. 484.

29. *Sphacelotheca strangulans*.

Add, under POACEAE:

**Eragrostis diffusa*, Arizona.

29. *Sphacelotheca Reiliana*.

Becomes a synonym of *Sorosporium Reilianum* (see page 1005).

30. *Sphacelotheca Hydropiperis*.

Add the synonym: *Sphacelotheca granosa* Liro, Ann. Acad. Sci. Fenn. A. 17: 48. 1924.

Add, under POLYGONACEAE:

**Bistorta vivipara* (*Polygonum viviparum*), Ellesmere Land.

Persicaria Hydropiper (*Polygonum Hydropiper*), Maine; Quebec.

Persicaria hydropiperoides (*Polygonum hydropiperoides*), Maine, Oregon, Washington; Nova Scotia.

Persicaria punctata (*Polygonum punctatum*, *P. acre*), Pennsylvania.

Persicaria sp. (*Polygonum* sp.), Michigan, Oregon.

Tracaulon sagittatum (*Polygonum sagittatum*), New Hampshire, New Jersey, Pennsylvania, Wisconsin; Nova Scotia.

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 35a, 35b, 35c; Arch. Nat. Land. Böhmen 15²: f. 12.

30. Insert:

16a. *Sphacelotheca inflorescentiae* (Trel.) Jaap, Ann. Myc. 6: 194. 1908.

Ustilago Bistortarum var. *inflorescentiae* Trel. Harriman Alaska Exp. Crypt. 35. 1904.

Ustilago inflorescentiae Maire; Broekm.-Jer. & Maire, Oesterr. Bot. Zeit. 57: 273. 1907.

Sphacelotheca Polygoni-viviparum Schellenb. Ann. Myc. 5: 388. 1907.

Sori in the flowers, infecting all, enwrapped by floral envelopes, covered by a delicate membrane which ruptures disclosing a dusty dark-purple spore-mass surrounding a small columella; sterile cells of membrane easily breaking up into single cells, ovoid to ovate, hyaline, thick-walled, chiefly about the size of the spores; spores light-purple to dark-purple, usually chiefly subspheric to spheric, occasionally somewhat angled or irregularly elongate, thick-walled, granular to minutely verruculate, chiefly 10-14 μ , rarely up to 17 μ in length.

ON POLYGONACEAE:

Bistorta bistortoides (*Polygonum bistortoides*), Washington.

Bistorta vivipara (*Polygonum viviparum*), Colorado, Wyoming; Alaska, Greenland.

TYPE LOCALITY: Unalaska, Alaska, on *Polygonum viviparum*.

DISTRIBUTION: Alaska to Colorado and Greenland, also in Europe.

NOTE. This was treated on page 24 as *Ustilago Bistortarum* var. *inflorescentiae*.

16b. *Sphacelotheca borealis* (Clinton) Schellenb. Ann. Myc. 5: 386. 1907.

Sphacelotheca Hydropiperis var. *borealis* Clinton, Proc. Boston Nat. Hist. 31: 395. 1904.

Sori in the ovaries, forming oblong or ovate bodies, 3–4 mm. in length, protected by floral envelopes at base, with false membrane dehiscing at apex, revealing a dark-purple spore-mass and a well-developed robust columella; sterile cells hyaline or slightly tinted, subspheric, thick-walled, chiefly slightly larger than the spores; spores violet-purple, ovoid to spheric or occasionally more irregular, often apparently smooth but really minutely granular, chiefly 9–11 μ in length.

ON POLYGONACEAE:

Bistorta bistortoides (*Polygonum bistortoides*), Colorado, Washington, Wyoming.

Persicaria (*Polygonum*) sp., California, Oregon; Nova Scotia.

TYPE LOCALITY: Mt. Rainier, Washington, on *Polygonum bistortoides*.

DISTRIBUTION: Washington and California to Colorado; Nova Scotia; also in Switzerland.

ILLUSTRATION: Beitr. Krypt. Schweiz 3²: f. 36.

NOTE: Treated on page 30 as *S. Hydropiperis* var. *borealis*.

30. *Melanopsichium austro-americanum*.

Add the synonym: *Sphacelotheca austro-americanum* (Speg.) Liro, Ann. Acad. Sci. Fenn. A. 17: 150. 1924.

Add, under POLYGONACEAE:

Persicaria lapathifolia (*Polygonum lapathifolium*), Iowa, Kansas, Maryland, Missouri, New York, Ohio, Oklahoma.

Persicaria pennsylvanica (*Polygonum pennsylvanicum*), Connecticut, Indiana, Maryland.

Persicaria sp. (*Polygonum* sp.), Kentucky, Oklahoma.

Add the note: An unusual form of this smut, on *Persicaria pennsylvanica*, in which the sori are on the stems and roots, was collected by Clinton on the farm of S. D. Woodruff & Sons, South Orange, Connecticut. P. Wilson collected specimens of this smut on *P. lapathifolia*, in which the sori were on the stems of the host, at the New York Botanical Garden.

31. *Cintractia Montagnei*.

Add the synonyms: *Cintractia Rhynchosporae* Ciferri, Ark. Bot. 23A¹⁴: 9. 1931. *Cintractia Ekmani* Ciferri, Ark. Bot. 23A¹⁴: 11. 1931. *Cintractia eximia* Ciferri, Ark. Bot. 23A¹⁴: 12. 1931. ? *Cintractia samanensis* Ciferri, Ark. Bot. 23A¹⁴: 13. 1931.

Add, under CYPERACEAE:

**Rynchospora barbata*, Santo Domingo.

**Rynchospora capitellata*, New York.

**Rynchospora distans*, Bermuda.

Rynchospora eximia, Santo Domingo.

Rynchospora glomerata, Delaware, Indiana.

**Rynchospora Marisculus*, Santo Domingo.

Rynchospora miliacea, Florida.

*? *Rynchospora oligantha*, Santo Domingo.

**Rynchospora podosperma*, Santo Domingo.

**Rynchospora stipitata*, Florida; Bermuda.

Add the illustrations: Ark. Bot. 23A¹⁴: pl. 1, f. 3; pl. 3, f. 9; Beitr. Krypt. Schweiz 3²: f. 41.

Add the exsiccati: Ciferri, Myc. Doming. Exs. 7, 8, 84.

32. Insert:

1a. *Cintractia Farlowii* Clinton, sp. nov.

Sori in the ovaries, more or less completely hidden by the enveloping glumes, 1–2 mm. in diameter forming at first a semi-agglutinated but finally a dusty or semi-dusty black spore-mass; spores dark-reddish-brown, in front view semi-circular but in side view reniform with the lighter thinner side cupped, often appearing falsely two-celled by the dark curved line of the outer wall apparently curling at the edge of the lighter-cupped area, chiefly 10–12 μ in length. (See page 1029.)

ON CYPERACEAE:

Rynchospora glomerata, New Jersey.

Rynchospora glomerata leptocarpa, Florida (Fort Reed).

Rynchospora sp., Massachusetts.

Type collected at Magnolia, Massachusetts, by Cora H. Clarke (Clinton herbarium, from W. G. Farlow).

DISTRIBUTION: Massachusetts to Florida.

NOTE: This species was first collected September 27, 1911. Farlow, in sending the specimen to the writer in October, wrote: "I supposed it was the usual *Cintractia* on *Rynchospora* of which I found a solitary specimen at Choconra this summer on *R. alba*, but the *Magnolia* specimen has different spores which do not seem to be arranged like those of *Cintractia*. They seemed at first to be arranged in twos but on further examination they seem rather to be lunate or crescentic spores which in drying have the ends rolled in so they meet and when seen in front view look like two spores adhering together." The spores give the impression of being those of a *Schizonella*, but a careful examination of the earliest stages shows that they have this cupped shape when still quite young, and there is no indication that two spores were originally found together and have fallen apart, as the cupped character might indicate. Furthermore, the young spores show the centripetal development of *Cintractia*. *C. Taubertiana* has spores about this size but more angular and without the peculiar cupping. *C. Leveilleana* R. Maire and *C. amazonica* Sydow on *Rynchospora* species are also different, judging from the descriptions.

32. *Cintractia Taubertiana*.

Add, under CYPERACEAE:

Rynchospora alba, New York, Pennsylvania.

**Rynchospora fusca*, New York.

Rynchospora sp., Delaware.

32. *Cintractia Psilocaryae*.

Add, under CYPERACEAE:

Psilocarya scirpoides, Indiana, Michigan.

32. Insert:

3a. *Cintractia arctica* Lagerh.; Vesterg. Micr. Rar. Sel. 182. 1899;

Bot. Notiser 1900: 30. 1900.

Sori on the leaves and culms as long striae often coalescing so as to cover the entire leaf-surface, at first covered by a delicate whitish membrane, which disintegrates revealing a black semi-agglutinated spore-mass; spores dark-reddish-brown, opaque, reticulate, chiefly 13-15 μ in length, occasionally up to 17 μ .

ON CYPERACEAE:

Carex sp., Colorado, Utah.

TYPE LOCALITY: Tromsø, Norway, on *Carex canescens* and *Carex glareosa*.

DISTRIBUTION: Colorado, Utah; also in Norway and Sweden.

EXSICCATI: Sydow, Ust. 72, 73, 218, 312.

32. *Cintractia Cyperi*.

Add, under CYPERACEAE:

**Cyperus cylindricus*, New Jersey.

Cyperus filiculmis, Massachusetts.

**Cyperus Grayii*, New Jersey.

32. *Cintractia subinclusa*.

Add, under CYPERACEAE:

**Carex atherodes*, British Columbia.

Carex lanuginosa, Saskatchewan.

**Carex stenophylla*, Colorado.

**Carex vesicaria* var. *monile* (*C. monile*), Ontario.

Carex sp., Manitoba, Quebec.

Add the illustration: Beitr. Krypt. Schweiz 32: f. 42.

33. *Cintractia Caricis*.

Add, under CYPERACEAE:

Carex acuta (*C. Goodenowii*), Quebec.

**Carex angustior* (*C. Leerii* var. *angustata*), New Hampshire.

Carex aquatilis, Alaska, Idaho, Michigan; British Columbia, Manitoba.

Carex artilecta (*C. varia*), Maryland, Massachusetts; Manitoba.

**Carex atherodes*, Saskatchewan.

**Carex atrata*, Montana.

- **Carex aurea*, Ontario, Quebec.
 **Carex blanda* (*C. laxiflora* var. *blanda*), Indiana.
Carex Buxbaumii (*C. polygama*), Connecticut.
Carex concolor (*C. Bigelovii*, *C. rigida*), Quebec.
 **Carex deflexa*, Colorado.
 **Carex diandra*, Ontario.
Carex Douglasii, California.
Carex filifolia, Montana, Nebraska, North Dakota, Wyoming; Saskatchewan.
 **Carex Geyeri*, Washington.
Carex gynocrates, Saskatchewan.
 **Carex heliophila*, Colorado, Utah; Saskatchewan.
Carex interior, Maine; Alberta.
Carex lanceata (*C. salina*), Nova Scotia.
 **Carex lasiocarpa* (*C. filiformis*), Montana; Ontario.
 **Carex leptalea*, Michigan.
Carex limosa, Nova Scotia, Saskatchewan.
 **Carex muricata* (*C. echinata*), Vermont; Quebec.
 **Carex nebraskensis*, Montana.
 **Carex obtusata*, Saskatchewan.
Carex paupercula, Quebec.
Carex pennsylvanica, Wisconsin.
Carex rostrata, Pennsylvania; Ontario.
 **Carex stenophylla*, California, Colorado.
Carex stricta, Alaska, Connecticut; Quebec.
 **Carex stricta* var. *angustata*, Ontario.
 **Carex substricta*, Saskatchewan.
Carex tetanica, North Dakota.
Carex umbellata, Indiana.
Carex sp., New Mexico.
Kobresia Bellardi (*Elyna Bellardi*), Ellesmere Land.

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 39; Arch. Nat. Land. Böhmen 15³: f. 13.

Add the exsiccati: Barth. Fungi Columb. 4908; Brenckle, Fungi Dak. 452.

Add the note: H. Sydow (Ann. Myc. 22: 288, 289. 1924) divides *C. Caricis* into eleven species, ten on *Carex* and one on *Elyna*, and gives a type host for each. His species, hosts, and spore-measurements are:

- Cintractia Caricis* (Pers.) Magnus, on *Carex montana*, 14-18 by 13-16 μ ;
Cintractia Caricis-albae Sydow, on *Carex alba*, 16-24 by 14-19 μ ;
Cintractia angulata Sydow, on *Carex curta*, 18-25 by 13-19 μ ;
Cintractia japonica Sydow, on *Carex capillacea*, 18-26 by 14-20 μ ;
Cintractia baccata (Wallr.) Sydow, on *Carex praecox*, 15-19 by 12-16 μ ;
Cintractia limosa Sydow, on *Carex limosa*, 17-26 by 14-21 μ ;
Cintractia pratensis Sydow, on *Carex glauca*, 16-25.5 by 14-22 μ ;
Cintractia turfosa Sydow, on *Carex dioica*, 19-25 by 14-19 μ ;
Cintractia microsora Sydow, on *Carex remota*, 15-23 by 13-19 μ ;
Cintractia arenaria Sydow, on *Carex arenaria*, 13-18 by 12-16 μ ;
Cintractia Elynae Sydow, on *Elyna spicata*, 16-20 by 14-17 μ .

34. *Cintractia externa*.

Add, under CYPERACEAE:

Carex filifolia, Colorado, North Dakota, Saskatchewan.

Add the exsiccati: Barth. Fungi Columb. 4808; Brenckle, Fungi Dak. 52.

34. *Cintractia Luzulae*.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 43.

34. *Cintractia Junci*.

Add, under CYPERACEAE:

Juncus bufonius, Pennsylvania.

**Juncus diffusissimus*, Indiana.

**Juncus Dudleyi*, New York.

Juncus tenuis, Delaware, District of Columbia, Indiana, Maryland, Virginia.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 44.

Add the exsiccati: Barth. Fungi Columb. 2416, 3216.

35. *Cintractia axicola*.

Add, under CYPERACEAE:

- Fimbristylis autumnalis*, New York, Oklahoma.
 **Fimbristylis complanata*, Puerto Rico.
Fimbristylis diphylla, Costa Rica; Santo Domingo; St. Thomas.
 **Fimbristylis ferruginea*, Mexico; Cuba; Santo Domingo; Jamaica; Puerto Rico; St. Kitts; St. Thomas.
 **Fimbristylis puberula* (*F. spadicea*), Santo Domingo.
 **Fimbristylis VahlII*, Oklahoma.
Fimbristylis sp., Arkansas, Florida.
 **Scirpus brizoides*, Panama, Trinidad.

Add the illustration: Ark. Bot. 23A¹⁴: pl. 2, f. 5.

Add the exsiccati: Ciferri, Myc. Doming. Exs. 3.

35. Insert:

11a. *Cintractia minor* (Clinton) Jackson, Mycologia 12: 153. 1920.

Cintractia axicola var. *minor* Clinton, Jour. Myc. 8: 143. 1902.

Sori at the base of the pedicels, elongate to subspheric, 3-6 mm. in length (rarely in ovaries and then shorter), at first with a thick whitish false membrane covering the olive-black agglutinated spore-mass; sterile cells apparently subspheric but usually indistinct through gelatinization; spores reddish-brown, ovoid to subspheric or slightly angled, apparently smooth, 10-13 μ in length.

ON CYPERACEAE:

- Cyperus Grayii*, Delaware, Maryland, New Jersey, New York.
Cyperus ligularis, Puerto Rico.
Cyperus rotundus, Puerto Rico.
Cyperus sphaclatus, Puerto Rico.

TYPE LOCALITY: New Jersey, Sandy Hook, on *Cyperus Grayii*.

DISTRIBUTION: New York to Maryland and Puerto Rico.

EXSICCATI: Ellis & Ev. N. Am. Fungi 2423.

NOTE: This was treated on page 35 as *Cintractia axicola* var. *minor*.

11b. *Cintractia Clintonii* Ciferri, Ann. Myc. 26: 30. 1928.

Sori usually in the ovaries of flower-parts, ovate, about 1-2 mm. in length, covered by a whitish membrane which ruptures revealing an agglutinated black spore-mass; sterile cells usually indefinite through gelatinization of wall; spores reddish-brown, opaque, spheric to subspheric, but angled by comparison, verruculate, chiefly 11-15 μ in length.

ON CYPERACEAE:

- Fimbristylis Holwayana*, Mexico.

TYPE LOCALITY: Mexico, on *Fimbristylis Holwayana*.

DISTRIBUTION: Mexico.

NOTE: The type of this smut was listed on page 35 under *Cintractia axicola*. There is a note with the specimen in the Clinton herbarium stating that this is an "unusual form with verruculose spores 12.5-15 μ ."

35. *Cintractia utriculicola*.

Add, under CYPERACEAE:

- **Marsicus jamaicensis* (*Cladium jamaicense*), Puerto Rico.
Rynchospora corymbosa, Santo Domingo.

Add the note: Ciferri (Ark. Bot. 23A¹⁴: 8. 1931) reports this smut from Santo Domingo, but his illustration (pl. 1, f. 2) seems to indicate that it is *Cintractia leucoderma*.

35. *Cintractia leucoderma*.

Add the synonyms: *Cintractia usambarensis* Ciferri, Ark. Bot. 23A¹⁴: 7. 1931. *Cintractia amicta* Ciferri, Ark. Bot. 23A¹⁴: 10. 1931. *Cintractia Portus-Argentii* Ciferri, Ark. Bot. 23A¹⁴: 14. 1931.

Omit the synonym: *Cintractia affinis* Peck.

Change the description to read as follows:

Sori surrounding pedicels, peduncles, or culms, forming conspicuous oval to elongate bodies, 7-35 mm. in length, covered with a thick white membrane that on gradually

wearing away exposes the firmly agglutinated black spore-mass; sterile cells more or less gelatinized; spores medium-reddish-brown to dark-reddish-brown, chiefly ovoid to subspherical or angled somewhat by pressure, obscurely to evidently verruculose, usually 13–18 μ , or on some hosts even 15–21 μ in length.

Add, under CYPERACEAE:

**Rynchospora barbata*, Santo Domingo (*Cintractia amicta*).

**Rynchospora corymbosa*, Panama; Cuba, Santo Domingo (*Cintractia usambarensis*), Puerto Rico.

**Rynchospora cyperoides*, Santo Domingo, Puerto Rico.

Rynchospora sp., Mexico (Sydow, Ust. 224); Santo Domingo (*Cintractia Portus-Argenti*).

Add the distribution: Mexico; Panama; West Indies.

Add the illustrations: Ark. Bot. 23A¹: pl. 1, f. 1, 4.

Omit, under CYPERACEAE:

Rynchospora corniculata, Florida.

Rynchospora corniculata macrostachya (*R. macrostachya*), New York.

Rynchospora Tracyi, Florida.

Add the exsiccati: Ciferri, Myc. Doming. Exs. 5, 6.

Add the note: This species is so variable in its different hosts that they run together if one attempts to separate them morphologically. If one were to base the smuts on host-species there would be 25–30 on *Rynchospora* alone, and it would then be chiefly a matter of determining the host rather than the smut.

36. Insert:

13a. *Cintractia striata* Clinton & Zuudell, sp. nov.

Similar to *C. leucoderma*, with sori on culms, 15–35 mm. in length; spores more regular and less fragile, light-reddish-brown, ovoid to chiefly subspherical or spherical, moderately thick-walled, with long, semispiral striae becoming verruculose at poles (seen best under an immersion-lens), 14–18 μ in diameter. (See page 1029.)

ON CYPERACEAE:

Rynchospora Tracyi, Florida.

Type collected at Fort Pickens, Florida, by S. M. Tracy (no. 8355), on *Rynchospora Tracyi*.

NOTE: Close to *Cintractia affinis*, but with spores smaller, lighter-colored and with a very distinctly marked epispore. Previously referred to *C. leucoderma* (N. Am. Flora 7: 36).

13b. *Cintractia affinis* Peck, Bull. N. Y. State Mus. 67: 28. 1903.

Similar to *C. leucoderma*, with sori on culms 3–6 cm. in length; spores dark-reddish-brown, ovoid to chiefly subspherical or spherical, moderately thick-walled, under lower power obscurely verruculose but with an immersion-lens showing verruculations, striae or even reticulations, 16–21 μ in diameter.

ON CYPERACEAE:

Rynchospora macrostachya, New York.

TYPE LOCALITY: Smithtown, Suffolk County, Long Island, New York, on *Rynchospora macrostachya*.

DISTRIBUTION: New York.

NOTE: Distinguished by larger more regular spores and distinct marking on epispores. Previously referred to *C. leucoderma* (N. Am. Flora 7: 36).

13c. *Cintractia pachyderma* H. Sydow, Ann. Myc. 22: 282. 1924.

Similar to *C. leucoderma*, with sori on pedicels, relatively short and thick, 10–15 mm. in length; spores more regular, chiefly subspherical to spherical, with a thin, brittle, striate epispore and a very thick (4–6 μ) apparently gelatinous endospore, 20–27 μ in diameter.

ON CYPERACEAE:

Rynchospora corniculata, Florida.

TYPE LOCALITY: Miami, Florida, on *Rynchospora corniculata*.

DISTRIBUTION: Florida.

EXSICCATI: Seymour & Earle, Econ. Fungi C104.

NOTE: Differs from *C. affinis* in having larger spores with very thick endospore. Previously referred to *C. leucoderma* (N. Am. Flora 7: 36).

36. *Schizonella melanogramma*.

Add, under CYPERACEAE:

- **Carex aquatilis* (*C. stans*), Herschel Island.
- **Carex communis*, Massachusetts, New Jersey, Tennessee.
- **Carex convoluta*, Indiana.
- **Carex laxiflora*, Ontario.
- **Carex longirostris*, Wisconsin.
- **Carex nebraskensis*, Nevada, Utah.
- **Carex pennsylvanica*, Indiana, Minnesota, North Dakota, Pennsylvania; Ontario.
- **Carex picta*, Indiana.
- **Carex tetanica*, Ontario.

Add the illustrations: Beitr. Krypt. Schweiz 3²: pl. 45; Arch. Nat. Land. Böhmen 15³: f. 14.

Add the exsiccati: Sydow, Ust. 239, 240, 284, 333, 334, 335, 469, 470, 486; Barth. Fungi Columb. 3480.

37. *Mykosyrinx Cissi*.

Add, under VITACEAE:

- Cissus acida* (*Vitis acida*), Yucatan; St. Croix.
- Cissus sicyoides*, Cuba.
- **Cissus trifoliata*, Santo Domingo; Puerto Rico.
- Cissus* sp., Campeche, Yucatan; British Honduras; Guatemala; St. Croix; St. Thomas.

37. *Sorosporium consanguineum*.

Add the synonym: *Sorosporium Aristidae* Neger, Anal. Univ. Chile 93: 789. 1896.

Add, under POACEAE:

- Aristida glauca*, California.
- Aristida longiseta*, Colorado, Kansas.
- Aristida Orcuttiana* (*A. Schiedeana*), Arizona.
- Aristida* sp., New Mexico.

Add the illustrations: Rev. Myc. II. 2: 83. f. 5; pl. II, f. 1-10.

38. Insert:

1a. *Sorosporium Reilianum* (Kühn) McAlpine, Smuts Austr. 181. 1910.

Sphaelotheca Reiliana (Kühn) Clinton (see page 29).

ON POACEAE:

- Sorghum vulgare*, Oklahoma.
- Sorghum* sp., Arizona.
- Zea Mays*, California, Idaho, Indiana, New Mexico, Oregon, Utah, Washington.

NOTE 1: For description and other data see pages 29 and 30.

NOTE 2: This species possesses the characteristic false membrane of *Sphaelotheca* and according to McAlpine the spore-balls of *Sorosporium*. Potter (Jour. Agr. Res. 2: 340. 1914) follows McAlpine in this classification. After a careful examination of the descriptions and illustrations of both these authors, and a slide sent by the former, we are still somewhat in doubt about the matter. Examination of mature spore-bearing material rarely shows any very characteristic spore-balls, although there is often an association of spores in irregular groups likely to be found with various smuts. Since, however, we have not had a chance to examine the fungus thoroughly in its various immature stages, we accept McAlpine's classification with these expressed doubts—to be removed or confirmed by further study if opportunity permits.

38. Insert:

2a. *Sorosporium ovarium* D. Griff. Bull. Torrey Club 34: 209. 1907.

Sori in the ovaries, at first concealed by the enveloping glumes, linear, 5-6 mm. in length, covered with a reddish-brown membrane which ruptures at the apex, revealing a dark-brown granular spore-mass; spore-balls oblong, often irregular, semi-permanent, opaque, chiefly 60-130 μ in length; spores light-reddish-brown, subspherical, often angular, minutely echinulate, chiefly 8-12 μ in diameter.

ON POACEAE:

- Panicum reptans* (*P. caespitosum*), Mexico.

TYPE LOCALITY: Dublin, Hidalgo.

DISTRIBUTION: Mexico.

2b. *Sorosporium confusum* H. S. Jackson, Bull. Torrey Club 35: 148. 1908.

Sori in the ovaries, enclosed by the enveloping glumes, 3-4 mm. in length, elongate, covered by a delicate membrane which ruptures irregularly disclosing a dark-brown granular spore-mass; spore-balls somewhat irregular, easily separating into spores when mature, chiefly 45-100 μ in length, occasionally somewhat smaller; spores reddish-brown, subspheric or polyhedral, often flattened and then appearing elongate or subcircular in section, according to view, verruculose, chiefly 11-14 μ (rarely as small as 9.5 or as large as 15 μ) in length.

ON POACEAE:

Aristida dichotoma, California, Delaware, Ohio, Pennsylvania.

Aristida longespicca (*A. gracilis*), Indiana.

?*Aristida purpurascens*, Alabama.

Aristida sp., Colorado, Texas.

TYPE LOCALITY: Newark, Delaware.

DISTRIBUTION: Delaware to Ohio and Alabama to California.

EXSICCATI: Ellis & Ev. N. Am. Fungi 1494.

NOTE: This was previously confused with *S. Ellisii* in N. Am. Flora. It is questionable if this species is really distinct from *S. Ellisii*; it differs by its somewhat smaller spores and by the sori, which are confined to the individual spikelets, but sometimes these distinctions fail and one is in doubt where to place individual specimens.

38. *Sorosporium Everhartii*.

Add, under POACEAE:

**Andropogon brachystachyus*, Florida.

**Andropogon furcatus*, Missouri.

**Andropogon ternarius*, Florida, North Carolina.

Andropogon virginicus, Louisiana, North Carolina, Pennsylvania.

Schizachyrium scoparium (*Andropogon scoparius*), New Hampshire, New Jersey, Pennsylvania, Vermont, Virginia.

Add the exsiccati: Barth. Fungi Columb. 3082, 4287.

38. *Sorosporium contortum*.

Add, under POACEAE:

Heteropogon contortus (*Andropogon contortus*), New Mexico.

38. *Sorosporium Syntherismae*.

Add, under POACEAE:

**Cenchrus incertus* (*C. carolinianus*), Indiana, Pennsylvania, Wisconsin.

**Cenchrus pallidus*, Nicaragua.

**Cenchrus pauciflorus*, Indiana, Oregon.

Cenchrus tribuloides, New Jersey, North Dakota; Ontario; Bermuda.

Cenchrus sp., Arkansas; San Luis Potosí.

Panicum capillare, Colorado, Connecticut, Missouri, North Dakota, Wisconsin; Ontario.

Panicum dichotomiflorum (*P. proliferum*), Connecticut, Idaho, Indiana, Maryland, Mississippi, New Jersey, New York, Pennsylvania, Virginia, West Virginia, Wisconsin.

**Panicum stramineum*, District of Columbia (in greenhouse).

**Panicum Vaseyanum*, Zacatecas.

Add the exsiccati: Breunckle, Fungi Dak. 497, 497a.

39. *Sorosporium Ellisii*.

Add, under POACEAE:

**Andropogon Elliottii*, Virginia.

**Andropogon glomeratus*, Louisiana, New Jersey.

Andropogon virginicus, Arkansas, Delaware.

Andropogon sp., Maryland.

Schizachyrium scoparium (*Andropogon scoparius*), Georgia, Indiana, Mississippi, South Dakota.

Add the exsiccati: Barth. Fungi Columb. 2879.

39. Insert:

6a. *Sorosporium Saponariae* F. Rudolphi, *Linnaea* 4: 116. 1829.

Ustilago Rudolphi Tul. Ann. Sci. Nat. III. 7: 99. 1847.

Microbotryum Rudolphi Lév. Dict. Univ. Hist. Nat. 12: 787. 1849.

Thecaphora Tunicae Auersw. Oesterr. Bot. Zeits. 18: 242. 1868.

Caecoma Schlechtendalii Klotzsch, Herb. Viv. Myc. 87. 1832.

Schizoderma Saponariae Fries, Syst. Myc. 3: 477. 1832.

Sorosporium dianthorum Ciferri, Ann. Myc. 26: 24. 1928.

Sorosporium Gypsophilae Ciferri, Ann. Myc. 26: 25. 1928.

Sorosporium Silenis-inflatae Ciferri, Ann. Myc. 26: 26. 1928.

Sorosporium Alsinearum Ciferri, Ann. Myc. 26: 27. 1928.

Sori prominent in the flowers, forming a light-brown, dusty, granular spore-mass enclosed by the floral envelopes; spore-balls quite temporary, composed of numerous spores, ovoid to subspheric, about 40–100 μ in length; spores light-golden-brown, ovoid, ovate (or occasionally even oblong) to subspheric, frequently somewhat irregular or flattened by pressure, with verruculate or slightly reticulate wrinkled epispore, often smoother on the sides of spores in contact, chiefly 12–19 μ in length.

ON CARVOPHYLLACEAE:

Alsine Curtisii (*Stellaria Curtisii*), Utah.

Alsine Jamesiana (*Stellaria Jamesiana*), Colorado, Utah.

Cerastium arvense, New York.

Cerastium occidentale, Colorado.

Cerastium oreophilum, Colorado.

Silene Menziesii, Utah.

Silene Watsoni, Nevada.

TYPE LOCALITY: Germany, on *Saponaria officinalis*.

DISTRIBUTION: New York to Nevada; also in Europe and western Asia.

ILLUSTRATIONS: Beitr. Krypt. Schweiz 3²: f. 79; Arch. Nat. Land. Böhmen 15²: f. 15.

39. *Sorosporium provinciale*.

Add, under POACEAE:

Andropogon furcatus, Iowa.

**Andropogon* sp., Texas.

39. *Sorosporium granulosum*.

Add, under POACEAE:

Stipa comata, Colorado.

**Stipa* sp., Oregon.

Add the note: While the two preceding species are both developed in the culms, aborting the inflorescence, and have larger and darker spore-balls than *Urocystis granulosa*, in the spikelet they often show collapsed slender cells of the *Urocystis* type and so these species may run into one another.

40. *Thecaphora pilulaeformis*.

Add, under CARDUACEAE:

**Isocoma coronopifolia* (*Bigelovia coronopifolia*), Arizona.

41. Insert

1a. *Thecaphora pustulata* Clinton; Chardon, Rev. Agr. P. Rico 6⁴: 23. 1921.

Sori on stems, usually at nodes, forming conspicuous oblong to subspheric swellings often 10–20 mm. in length, with numerous more or less distinct blisters breaking out on these and eventually disclosing the dusty umber spore-masses; spore-balls when young with an evident hyaline envelope or indistinct mycelial threads, which by gelatinization disappear with maturity, chiefly subspheric, with 2–8 (usually 3–6) spores more or less firmly bound together, 24–45 μ in diameter, spores yellowish to reddish-brown, ovoid to subspheric but flattened on sides where in contact, prominently and abundantly verruculose on rounded free surface, chiefly 18–25 μ in length.

ON COMPOSITAE:

Bidens leucantha, Puerto Rico.

TYPE LOCALITY: Mayaguez, Puerto Rico, on *Bidens leucantha*.

DISTRIBUTION: Puerto Rico.

NOTE: The spore-balls contain about the same number of spores as those of *Thecaphora pilulaeformis* and *T. Trailii*, but the spores and consequently the spore-balls are considerably larger and the sori macroscopically resemble more those of *T. mexicana*.

41. *Thecaphora Trailii*.

Add, under CARDUACEAE:

**Cirsium Centaureae* (*Carduus Centaureae*), Colorado.

Add the exsiccati: Barth. Fungi Columb. 2383.

41. *Thecaphora californica*.

Add, under CARDUACEAE:

**Grindelia inornata*, Colorado.

**Grindelia squarrosa*, Colorado.

Add the note: In some specimens the sori develop as fusiform swellings on the stem.

41. *Thecaphora cuneata*.

Add, under CARDUACEAE:

Grindelia squarrosa, Colorado, New Mexico, Utah; Manitoba.

Add the exsiccati: Barth. Fungi Columb. 3287.

41. *Thecaphora deformans*.

Add, under FABACEAE:

**Astragalus Chamaeleuce*, Colorado.

**Astragalus mollissimus*, Colorado.

**Astragalus Mortonii*, California.

**Astragalus Thompsonae*, Utah.

**Astragalus Wooloni*, New Mexico.

**Lathyrus utahensis*, Utah.

**Vicia oregona*, Utah.

**Vicia trifida*, Utah.

**Vicia* sp., Ontario.

Add the exsiccati: Sydow, Ust. 368.

Add the note: Bubák in Houbý České 2: 38 (1912) transfers the forms on *Vicia* sp. to *Thecaphora Viciae* Bubák without giving a description; further study may show that this is distinct.

42. Insert:

7a. *Thecaphora Haumani* Speg. Revista Argent. Bot. 1: 150. 1925.

Sori in the inflorescence and stems, pustular, more or less agglutinated and covered by the greenish plant-tissues; pustules about 2-3 mm. but often merging into lobular masses 15 mm. in length; spore-balls reddish-brown, composed of 3-15 rather firmly adhering spores, 18-45 μ in length; spores yellowish-brown, irregularly ovate to subspheric, the sides more or less flattened under pressure, the free surface papillately roughened, chiefly 13-20 μ in length.

ON AMARANTHACEAE:

Iresine Celosia, Guatemala.

TYPE LOCALITY: Campana, Buenos Aires, Argentina, on *Iresine paniculata*.

DISTRIBUTION: Guatemala; also in Argentina.

NOTE: Closely related to *T. Iresine*, but differing in considerably smaller spore-balls and somewhat smaller spores and pustules on stems. We have not seen the Spegazzini specimen, but we agree with Mains in placing the Guatemala specimen here.

7b. *Thecaphora Iresine* (Elliott) H. S. Jackson, Mycologia 12: 154. 1920.

Tolyposporium Iresine Elliott, Mycologia 11: 88. 1919.

Sori in the ovaries of the inflorescence, as irregular lobed mass-outbreaks consisting of certain of the individual blossoms more or less compacted together, the individual lobes 1-3 mm. in diameter while semi-merged lobular masses may attain 1 cm. in length, covered by greenish plant-tissues, rupturing irregularly, and shedding a granular purplish-red spore-mass; spore-balls firm, reddish-brown, composed of 10 to many spores, ovoid to subspheric, 35-90 μ , chiefly 45-60 μ in length; spores light-reddish-yellow, or the inner spores yellowish, irregularly ovate to subspheric, the sides often flattened through pressure, the wall on free sides thickened and inconspicuously papillate, chiefly 15-20 μ , most elongate rarely 27 μ in length.

ON AMARANTHACEAE:

Iresine Celosia (*I. paniculata*), Indiana.

TYPE LOCALITY: Near Half Moon Pond, ten miles south of Mount Vernon, Posey County, Indiana, on *Iresine paniculata*.

DISTRIBUTION: Indiana.

ILLUSTRATIONS: Mycologia 11: 87. f. 1-4.

NOTE: Very near *Thecaphora Thornberi*, also on *Amaranthaceae*, but differing from that species by the smaller spore-balls (chiefly 45-60 μ as compared with chiefly 75-120 μ) and consequently fewer spores, which seem to be less frequently elongate. The papillae at the free ends of the spores are rather inconspicuous in both species.

43. Insert:

DOUBTFUL AND EXCLUDED SPECIES

Thecaphora Cornuana Fisch. de Waldh. Aperçu Syst. Ust. 35. 1877. Sori in the ovaries; spore-balls globose to obtusely ovoid, 50-90 μ in length, composed of many spores (up to 50 and more); spores olivaceous-brown, angular, 8-14 μ in diameter. ON CYPERACEAE: *Scirpus affinis*, Guadeloupe. No specimen of this West Indian smut was available for examination and it is not known where the type is deposited; it is therefore excluded until a specimen is located and examined.

Thecaphora Ruppiae Setch. Mycologia 16: 243. 1924. On *Ruppia maritima* var. *rostrata*, California. Later researches show that this fungus is *Tetramyxa parasitica* Göbel.

43. Insert:

1a. *Tolyposporella Sporoboli* H. S. Jackson; Whetzel & Kern, Mycologia 18: 122. 1926.

Sori in sheaths and blades (apparently upper surface) of the leaves, forming usually elongate striae of varying length that on rupture show as black granular outbreaks; spores not formed in definite spore-balls but more or less agglutinated, dark-reddish-brown, with the thin outer wall often running into a point and the swollen inner wall 2-4 μ thick, ovoid to subspheric or somewhat flattened through pressure, 9-15 μ or, rarely more elongate, even 18 μ in length.

ON POACEAE:

Sporobolus indicus, Puerto Rico.

TYPE LOCALITY: El Yunque, Puerto Rico, on *Sporobolus indicus*.

DISTRIBUTION: Puerto Rico.

NOTE: The Ciferri specimen from Santo Domingo (Myc. Dom. Exs. 96) named as this on *Sporobolus argutus* does not agree with this Puerto Rican specimen, but is apparently *Entyloma speciosum*.

43. *Tolyposporella Brunkii*.

Add, under POACEAE:

**Andropogon bicornis*, Santo Domingo; Puerto Rico.

Add the note: Ciferri reported this smut from Santo Domingo but gives the spore-measurements as 7-12 μ , while they are commonly 11-18 μ in length; the Ciferri specimen was not available for examination.

44. *Tolyposporella Nolinae*.

Add, under DRACAENACEAE:

Nolina microcarpa, New Mexico.

**Nolina texana*, Texas.

44. *Tolyposporium bullatum*.

Add, under POACEAE:

- Echinochloa Crus-galli* (*Panicum Crus-galli*), Indiana, Pennsylvania, South Dakota.
 **Echinochloa frumentacea*, Connecticut.
 **Echinochloa Walteri*, Indiana, New York.

44. Insert:

- 1a. *Tolyposporium Junci* (Schroet.) Woronin, Abh. Senck. Nat. Ges. 12: 577.
 "1881" [Ja 1882].

Sorosporium Junci Schroet. Abh. Schles. Ges. Vat. Med. 1869-1872: 6. 1871.

Sori in the inflorescence involving part of spikelets, often confined to base and contents of ovary or spreading to adjacent bracts and rachis, forming a black, granular, agglutinated mass; spore-balls forming irregular, opaque masses of several to many spores, 18-50 μ in length; spores not easily separated, variable, more or less angular, reddish-black, external wall or where not in contact thicker, chiefly 9-15 μ in length, rarely longer.

ON JUNCACEAE:

Juncus bufonius, Oregon.

TYPE LOCALITY: Germany, on *Juncus bufonius*.

DISTRIBUTION: Oregon; also in Europe.

ILLUSTRATIONS: Bref. Unters. Gesamnt. Myk. 12: pl. 9, f. 13-24; E. & P. Nat. Pil. 14**: 13. f. 8H; McAlpine, Smuts Austr. pl. 47, f. 159, 160; Lind, Dan. Fungi Rostr. f. 18; Sorauer, Handb. Pflanzenkr. ed. 3. 2: 329. f. 46¹⁰; Beitr. Krypt. Schweiz 3²: f. 46; Arch. Nat. Land. Böhmen 15³: f. 16.

45. *Testicularia Cyperi*.

Add, under CYPERACEAE:

- **Rynchospora corniculata*, Florida, Louisiana, Texas

Family 2. TILLETIACEAE

48. *Tilletia foetens*.

Add, under POACEAE:

- **Secale cereale*, Kansas.
Triticum aestivum (*T. vulgare*), Arizona, Arkansas, California, Connecticut, Delaware, Georgia, Idaho, Maine, Mississippi, Missouri, Nevada, New Mexico, New York, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, Washington; Alberta, New Brunswick, Saskatchewan.
 **Triticum dicoccum*, Missouri.
 **Triticum durum*, North Dakota; Manitoba, Saskatchewan.

Add the exsiccati: Barth. Fungi Columb. 4785; Brenckle, Fungi Dak. 132.

48. *Tilletia Triticis*.

Add the synonym: *Tilletia Secalis* (Corda) Wint. in Rab. Krypt.-Fl 1¹: 110. 1881 (also Bot. Zeit. 34: 471. 1876).

Add, under POACEAE:

- **Secale cereale*, New York, Washington.
Triticum aestivum (*T. vulgare*), Arkansas, California, Colorado, Connecticut, Delaware, Georgia, Idaho, Indiana, Maryland, Massachusetts, Mississippi, Missouri, Nebraska, New Mexico, North Carolina, North Dakota, South Dakota, Tennessee, Texas, Virginia; Alberta, Manitoba, New Brunswick, Prince Edward Island, Quebec, Saskatchewan.
 **Triticum dicoccum*, North Dakota; Alberta.
 **Triticum durum*, North Dakota; Manitoba, Saskatchewan.
 **Triticum Spelta*, Idaho, Indiana, North Dakota, Utah; Ontario.

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 47; Arch. Nat. Land. Böhmen 15³: f. 18.

Add: EXSICCATI: Brenckle, Fungi Dak. 132a.

48. *Tilletia Elymi*.

Add, under POACEAE:

Elymus glaucus, Colorado, Wyoming.

Change the distribution: Rocky Mountains and Pacific northwest.

48. *Tilletia Anthoxanthi*.

Add, under POACEAE:

Anthoxanthum odoratum, Pennsylvania; Nova Scotia.

49. Insert:

4a. *Tilletia Guyotiana* Hariot, Jour. de Bot. 14: 117. 1900.*Thecaphora Guyotiana* Hariot, Mém. Soc. Acad. Aube 61: 195; hyponym. 1898.*Tilletia Velenovskyi* Bubák, Oesterr. Bot. Zeits. 53: 51. 1903.*Tilletia belgradensis* Magnus, Hedwigia 48: 145. 1908.

Sori in ovaries, oblong to oval, pointed, with styles and delicate ovary-walls usually intact, 3-4 mm. in length, chiefly hidden by the enveloping glumes, infecting all of the spikelets; sterile hyaline cells occasional, subspheric, with moderately thick and smooth walls, considerably smaller than the spores; spores usually golden-yellow (in European specimens sometimes mixed with others having a purplish tint), subspheric to spheric or occasionally more elongate, with prominent regular reticulations about 2-4 μ in diameter and extending 1-2 μ beyond the margin, 20-26 μ in length, or more elongate rarely 30 μ .

ON POACEAE:

Bromus mollis (*B. hordeaceus*), Idaho, Washington.*Bromus racemosus* (*B. hordeaceus* var. *glabrescens*), Idaho, Washington.*Bromus* sp., California.TYPE LOCALITY: Gye-sur-Seine, Aube, France, on *Bromus erectus*.

DISTRIBUTION: Western United States; also in Europe and Asia.

ILLUSTRATION: Hedwigia 48: 146. f. 1-7.

49. *Tilletia Muhlenbergiae*.

Add, under POACEAE:

**Muhlenbergia* sp., Aguas Calientes.49. *Tilletia cerebrina*.Becomes a synonym of *Tilletia Airae*.49. *Tilletia Airae*.Add the synonym: *Tilletia cerebrina* Ellis & Ev. Jour. Myc. 3: 56. 1887.

Add, under POACEAE:

Deschampsia caespitosa, Rocky Mountains.*Deschampsia elongata*, Idaho.49. *Tilletia fusca*.

Add, under POACEAE:

**Festuca pacifica*, Washington.

50. Insert:

9a. *Tilletia Holci* (Westend.) De-Toni, in Sacc. Syll. Fung. 7²: 484. 1888.*Polycystis Holci* Westend. Bull. Acad. Belg. 11. 11: 651. 1861.*Tilletia Rauwenhoffii* Fisch. de Waldh. Aperçu Syst. Ust. 50. 1877.

Sori in the ovaries, apparently all of the spikelets infected, more or less hidden by the enveloping glumes, forming an oblong or ovoid body about 2 mm. in length, with the styles still attached and the fragile thin ovary-coats concealing the dusty brown-black spore-mass; sterile cells few, hyaline, moderately thin-walled, ovoid to subspheric, smooth,

smaller than the spores; spores light-reddish-brown, chiefly subspheric or spheric, with evident rather uniform polygonal reticulations (3-6 μ in length) of the outer coat extending at the circumference as conspicuous hyaline spiny-ribbed wings (2-4 μ), chiefly 24-30 μ in length (including wings).

ON POACEAE:

Holcus lanatus, Massachusetts, Oregon, Pennsylvania, Washington.

TYPE LOCALITY: Belgium, on *Holcus lanatus*.

DISTRIBUTION: Pacific Northwest, Massachusetts, and Pennsylvania; also in Europe and New Zealand.

ILLUSTRATIONS: Bull. Acad. Belg. II. 11: f. 1; Kew Bull. 1899: pl. 4, f. 4, 5; McAlpine, Smuts Austr. pl. 49, f. 178, 179.

EXSICCATI: Sydow, Ust. 372.

50. *Tilletia asperifolia*.

Add, under POACEAE:

**Muhlenbergia arenacea* (*Sporobolus auriculatus*), New Mexico.

Muhlenbergia asperifolia (*Sporobolus asperifolius*), California.

**Sporobolus microspermus* (*S. confusus*), Colorado.

50. Insert:

11a. *Tilletia decipiens* Körn. Hedwigia 16: 30. 1877.

Uredo segetum var. *decipiens* Pers. Syn. Fung. 225. 1801.

Uredo decipiens var. *graminum* Strauss, Ann. Wett. Ges. 2: 111. 1810.

Erysibe sphaerococca var. *Agrostidis* Wallr. Fl. Crypt. Germ. 2: 213. 1833.

Uredo (*Ustilago*) *sphaerococca* Rab. Deutschl. Krypt.-Fl. 1: 4. 1844.

Tilletia caries var. *Agrostidis* Auersw.; Rab. Fungi Eur. 700. 1864.

Tilletia sphaerococca Fisch. de Waldh. Bull. Soc. Nat. Mosc. 40: 255. 1867.

Sori in the ovaries, involving most of the inflorescence, somewhat concealed by the enveloping glumes, elliptic to ovate, about 1 mm. in length; spores light-brown or golden-brown to reddish-brown, chiefly subspheric or spheric, with numerous reticulations, sometimes indistinct at center of spores but always evident at margins as wings extending out about 2-3 μ , chiefly 22-27 μ , or irregular and the largest even 30 μ in diameter.

ON POACEAE:

Agrostis perennans var. *elata* (*A. elata*), Tennessee.

TYPE LOCALITY: Europe, on *Agrostis vulgaris* (*A. pumila*).

DISTRIBUTION: Tennessee; also in Europe, Azores, and New Zealand.

ILLUSTRATIONS: Beitr. Krypt. Schweiz 3: f. 49; Arch. Nat. Land. Böhmen 15: f. 19.

NOTE: Our single specimen was collected by S. M. Bain, October 10, 1892, at Jackson, Tennessee, and was sent to us by Professor Hesler. It is on a new host and does not agree exactly with the European specimens, but this may be due to immaturity. The spores often appear coarsely spiny or tuberculate, rather than reticulate, but the wings can usually be seen at the circumference. The type on *Agrostis vulgaris* causes a stunting of the plants, which are then sometimes known as *A. pumila*; also found on *A. stolonifera*.

50. *Tilletia Earlei*.

Add the synonym: *Ustilago Earlei* Ciferri, Trans. Brit. Myc. Soc. 18: 263. 1934.

Add, under POACEAE:

**Agropyron repens*, North Dakota.

Add the note: Only actual germination of spores will definitely determine the systematic position of a smut. The formation of the sori on the leaves is not enough to change a species from *Tilletia* to *Ustilago*; the spores in this species are typical for *Tilletia*.

51. *Tilletia texana*.

Add, under POACEAE:

**Hordeum pusillum*, Missouri, Oklahoma.

Add: EXSICCATI: Rab.-Paz. Fungi Eur. 4404.

51. Insert:

15a. *Tilletia Youngii* Clinton & Zundel, sp. nov.

Sori in the ovaries of the inflorescence occupying most of the spikelets, especially the upper, hidden almost completely by the enveloping glumes, covered by a thin plant-

membrane, elliptic but tapering into a style-like apex, about 2 mm. in length (including the tapering apex), also in the internodes forming more or less elongate swellings from the base upward, stunting the plants, and colored purplish-red; sterile cells subspheric to spheric (often with a papilla at one end), medium to thin-walled, hyaline, 10-15 μ in diameter; spores subspheric to spheric, hyaline to light-golden-yellow but often golden-brown with age, with prominent spiny tubercles becoming less conspicuous and blunt with maturity, and projecting 2-3 μ to hyaline envelope, chiefly 23-27 μ in diameter, sometimes even 30 μ . (See page 1029.)

ON POACEAE:

Alopecurus carolinianus (*A. ramosus*), Arkansas.

Type collected at Mariana, Arkansas, on *Alopecurus ramosus*, by V. H. Young, April, 1926.

DISTRIBUTION: Arkansas.

NOTE: This seems to come nearest to *T. texana* and *T. Wilcoxiana*. It is curious that both culms and ovaries are infected.

51. *Tilletia buchloeana*.

Change description of spores to read: "spores obscurely reticulate to coarsely tuberculate."

Add, under POACEAE:

Buchloë dactyloides (*Bulbilis dactyloides*), Nebraska.

52. *Tilletia corona*.

Add, under POACEAE:

Leersia lenticularis, Wisconsin.

Leersia oryzoides, Wisconsin.

Leersia virginica, Iowa, Maryland, Wisconsin.

52. *Tilletia pulcherrima*.

Add, under POACEAE:

**Panicum capillare*, Pennsylvania.

Panicum virgatum, Iowa, Kansas.

52. *Tilletia horrida*.

Add, under POACEAE:

Oryza sativa, Arkansas, Louisiana.

53. Insert the doubtful species:

Tilletia chloridicola Ciferri, Ann. Myc. 26: 10. 1928. ON POACEAE: *Chloris paraguayensis* (*C. barbata*), Santo Domingo. TYPE LOCALITY: Haina, Santo Domingo, on *Chloris paraguayensis*. DISTRIBUTION: Santo Domingo. NOTE: We have seen no specimen of this species; its spores are given as 12.5-15 μ or occasionally 18 μ , which seem rather small for a *Tilletia*. A Latin description accompanies Ciferri's paper, to which the reader is referred. It is the only *Tilletia* reported on *Chloris*, though six other smuts have been described on this host-genus.

54. *Tubercinia Clintoniae*.

Add, under CONVALLARIACEAE:

Streptopus roseus, Wisconsin.

54. *Tubercinia Trientalis*.

Add, under PRIMULACEAE:

**Trientalis latifolia*, Oregon, Washington.

55. *Urocystis Waldsteiniae*.

Add the synonym: *Tubercinia Waldsteiniae* Liro, Ann. Univ. Fenn. Aboen. A, 1¹: 91. 1922.

Add, under ROSACEAE:

Waldsteinia fragarioides, Quebec, Saskatchewan.

Add the note: The systematic position of this species is still doubtful. Recently it has been proved not to be a typical *Urocystis*, since it germinates like a *Ustilago* but has fragments of sterile cells.

55. *Urocystis Anemones*.

Add the synonym: *Tuburcinia Anemones* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 55. 1922.

Add, under RANUNCULACEAE:

Anemone quinquefolia, Delaware; Ontario.

Anemone virginiana, Indiana.

Hepatica acuta (*H. acutiloba*), Maine, Pennsylvania.

Hepatica americana, New York, Virginia.

Hepatica sp., Ohio.

Pulsatilla ludoviciana (*P. hirsutissima*, *Anemone patens* var. *Nuttalliana*, *A. patens* var.

Wolfgangiana), North Dakota, South Dakota; Alberta, Manitoba, Saskatchewan.

**Ranunculus septentrionalis*, Missouri.

Ranunculus sp., British Columbia.

Syndesmon thalictroides (*Anemonella thalictroides*), Iowa.

**Trautvetteria grandis*, Utah.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 72.

Add the exsiccati: Sydow, Ust. 473; Brenckle, Fungi Dak. 18.

Add the note: The spores on *Syndesmon thalictroides* are a little too long for this species; they measure about half as much as those of *U. sorosporioides*. On page 55, *Syndesmon thalictroides* was listed from New York as a host of this smut; this host has since been determined as *Thalictrum* sp. and the smut as *Urocystis sorosporioides* (see below).

55. *Urocystis carcinodes*.

Add the synonym: *Tuburcinia carcinodes* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 80. 1922.

Add, under RANUNCULACEAE:

**Aconitum columbianum*, Utah.

Actaea alba, Pennsylvania.

**Actaea viridiflora* (*A. rubra*), Idaho, Utah.

Cimicifuga racemosa, New York, Virginia.

56. *Urocystis sorosporioides*.

Add the synonym: *Tuburcinia sorosporioides* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 77. 1922.

Add, under RANUNCULACEAE:

**Anemone narcissiflora*, Alaska.

**Aquilegia caerulea*, Utah.

**Beckwithia Andersonii*, Nevada.

**Delphinium decorum*, California.

**Delphinium tricorne*, Kentucky.

Thalictrum sp., New York (erroneously reported on page 55 as *Urocystis Anemones* on *Syndesmon thalictroides*).

Add: ILLUSTRATION: Beitr. Krypt. Schweiz 3²: f. 73.

Add: EXSICCATI: Barth, Fungi Columb. 3493; Sydow, Ust. 375.

56. *Urocystis Violae*.

Add the synonym: *Tuburcinia Violae* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 91. 1922.

Add, under VIOLACEAE:

**Viola glabella*, Alaska.

**Viola longipes*, Utah.

**Viola Nuttallii*, California.

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 74; Arch. Nat. Land. Böhmen 15²: f. 23.

56. Insert:

5a. *Urocystis Kmetiana* Magnus, Verh. Bot. Ver. Brand. 31: xix. 1890.

Tuburcinia Kmetiana Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 94. 1922.

Sori confined to the ovaries, forming rounded masses 3-5 mm. in diameter, on rupture disclosing a granular black spore-mass; spore-balls reddish-brown, irregularly oblong to

chiefly subspheric, 20–60 μ , usually 30–40 μ in length; sterile cells rather completely covering the spore-balls, semihyaline to yellow-brown, usually collapsing or cupping with age, chiefly 8–12 μ in length; spores reddish-brown, often flattened when in contact with other spores, irregularly ovoid to subspheric, 2–10, chiefly 4–8, in a ball, 11–16 μ in length.

ON VIOLACEAE:

Viola Rafinesquii, Arkansas, Missouri, Tennessee.

TYPE LOCALITY: Hungary, on *Viola tricolor* var. *arvensis*.

DISTRIBUTION: Arkansas, Missouri, Tennessee; also in Europe.

NOTE: Magnus states that this species has spores and spore-halls similar to those of *Urocystis Viola*, differing in being confined entirely to the ovaries, while the latter occurs on the stems and leaves. We find this true of the American specimen, whose host at one time was also considered identical with the European. It is doubtful whether the two smuts are distinct. Our specimens agree with those of Rab.-Paz. Fungi Eur. 4107, and Vesterg. Micr. Rar. Sel. 332. Rosen states this smut is not uncommon in the region of Fayetteville, Arkansas.

56. *Urocystis Lithophragmae*.

Add the synonyms: *Tuburcinia Lithophragmae* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 87. 1922. ?*Urocystis Heucherae* Garrett, Mycolog'a 25: 151. 1933.

Add, under SAXIFRAGACEAE:

Heuchera parvifolia, Utah.

57. *Urocystis Cepulae*.

Add the synonym: *Tuburcinia Cepulae* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 47. 1922.

Add, under ALLIACEAE:

Allium Cepa, Alabama, California, Colorado, Illinois, Iowa, Kentucky, Maine, Maryland, Minnesota, North Dakota, Oregon, Pennsylvania, South Dakota, Alberta, Manitoba, Ontario, Quebec; Puerto Rico.

57. Insert:

7a. *Urocystis magica* Pass.; Thüm. Myc. Univ. 223. 1875.

Tuburcinia magica Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 49. 1922.

Sori in leaves, slightly elevated, isolated or confluent, large, elongate, at first lead-colored and covered by the epidermis, upon rupture exposing a brownish-black spore-mass; spore-halls dark-reddish-brown, ovoid to spheric, 19–35 μ in length; sterile cells light-brown, thick-walled, rather closely covering the spores, 5.5–9.5 μ in length; spores reddish-brown, ovoid to subspheric, often somewhat irregular in shape, usually solitary, rarely 2 in a ball, chiefly 15–19 μ in length.

ON ALLIACEAE:

Allium Palmeri, Utah.

TYPE LOCALITY: Paria, Italy, on *Allium magicum*.

DISTRIBUTION: Utah; also in Italy.

ILLUSTRATIONS: Ann. Rep. Conn. Exp. Sta. 1889. pl. 2, f. 5, 6.

EXSICCATI: Thüm. Myc. Univ. 223; Rab. Fungi Eur. 2100.

NOTE: This is the first report of this smut in North America, although it was collected by Dr. E. Palmer (453) at Beaver City, Utah, in 1877, and sent to us by J. C. Arthur. It seems to agree much more nearly with *U. magica* than it does with *U. Cepulae*. The spore-halls are chiefly 19–35 μ in length, and rather closely covered with reddish-brown, rather thick-walled sterile cells, 5.5–9.5 μ in length, with generally one, rarely two fertile cells (reddish-brown), these chiefly subspheric to oval but often somewhat irregular and 15–19 μ in length. It differs from *U. Cepulae* chiefly in the larger size of the spore-halls and sterile (?) parts.

7b. *Urocystis Erythronii* Clinton, sp. nov.

Sori in the leaves, elliptic, small, 1–2 mm. in length but usually merging lengthwise into linear striae and often sidewise into irregular areas and so often losing their individuality, showing on both surfaces as lead-colored slightly raised granular blisters that are covered rather permanently by the epidermis; spore-balls ovoid to subspheric, very dark-reddish-brown or blackish-brown, opaque or subopaque, with tinted cortex of indefinite collapsed sterile cells completely, thickly, and permanently investing the 1–3, rarely 4 or 5 spores, chiefly 25–45 μ in length; spores dark-reddish-brown, usually subspheric when single but often more elongate and flattened when with two or more in a ball, 15–18 μ , rarely 21 μ . (See page 1029.)

ON LILIACEAE:

Erythronium americanum, Connecticut, New York.

Type collected on *Erythronium americanum*, by G. P. Clinton, at Centerville, Connecticut, April-May, 1908.

DISTRIBUTION: Connecticut and New York.

NOTE: This species is quite distinct from *Urocystis Colchici* on *Colchicum* and even from the darker-spored form on *Muscari* and *Camassia* by the very dark spore-balls with the indefinite collapsed sterile cells completely and permanently covering the spores. It is almost impossible to measure the spores on this account and the real nature of the sterile cells is only surely made out by boiling the infected tissue in a weak solution of caustic soda. We know of no other species of *Urocystis* with such permanent spore-balls and with so completely collapsed and tightly adhering cortex that resembles more an outer ridged coat than distinct cells. To a certain extent the species approaches the genus *Tubercinia*. The type was associated with *Ustilago Heufleri*.

57. *Urocystis Colchici*.

Add the synonym: *Tubercinia Colchici* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 52. 1922.
Add, under CONVALLARIACEAE:

**Camassia Quamash* (*C. esculenta*), Oregon.

**Camassia scilloides* (*C. Fraseri*), Indiana.

**Colchicum autumnale*, New York; Ontario.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 169.

57. Insert:

8a. *Urocystis Trillii* H. S. Jackson, Mycologia 12: 151. 1920.

Sori in the stems, petioles, and leaf-blades, scattered or clustered, forming subcircular to chiefly elliptic pustules 3-10 mm. in length (or by merging longer), covered at first by the epidermis but soon rupturing and disclosing the purple-black, dusty spore-mass mixed with white strands of plant-tissue; spore-balls firm, ovoid to subspheric, dark-reddish-brown, consisting chiefly of 2-12 spores surrounded by a moderately tinted and thin-walled cortex of often collapsed sterile cells (about 8-14 μ), 25-70 μ in length; spores reddish-brown, ovoid to subspheric, flattened where in contact, with thick apparently smooth walls, 12-18 μ in length or rarely longer.

ON TRILLIACEAE:

Trillium chloropetalum, Oregon.

Trillium grandiflorum, Quebec.

Trillium ovatum, Idaho.

TYPE LOCALITY: Corvallis, Benton County, Oregon, on *Trillium chloropetalum*.

DISTRIBUTION: Oregon, Idaho.

8b. *Urocystis Flowersii* Garrett, Mycologia 18: 286. 1926.

Sori on leaves, slightly pustular, elliptic, lead-colored before opening by a central crack and then blackish with an agglutinated spore-mass, 1-2 mm., or by coalescence even 5 mm. or more in length; spore-balls more or less irregular, oblong to subspheric, dark-brown, 25-80 μ in length; sterile cells yellowish-brown, ovoid to elliptic, rather completely covering the spores and somewhat smaller; spores reddish-brown, irregular, ovoid to subspheric, chiefly 5-12 in a ball, apparently rather firmly held together, 10-18 μ in length.

ON MELANTHACEAE:

Anticlea elegans (*Zygadenus elegans*), Utah.

TYPE LOCALITY: Glacier Cirque, Mt. Timpanogos, above Aspen Grove, Utah County, Utah, on *Zygadenus elegans*.

DISTRIBUTION: Utah.

NOTE: The spore-balls are somewhat immature and are so tightly bound together that the size and shape of the spores are not easily determined in the type specimen.

8c. *Urocystis Gladioli* (Requien) W. G. Smith, Gard. Chron. II. 6: 421. 1876.

Uredo Gladioli Requien; Duby, Bot. Gall. 901. 1830.

Erysibe arillata var. *Gladioli* Wallr. Fl. Crypt. Germ. 3: 211. 1833.

Tubercinia Gladioli Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 37. 1922.

Sori on the corms and leaves, pustular, small, dark-colored, at first covered by the epidermis; spore-balls dark-reddish-brown, ovoid to spheric, chiefly 45-50 μ in diameter, rarely 65 μ or as small as 24 μ ; sterile cells completely covering the spores, brownish-

yellow, thick-walled, ovoid, sometimes difficult to distinguish from the spores, chiefly 6–10 μ in diameter; spores dark-reddish-brown, ovoid to spheric, often flattened on one side, smooth, chiefly 4–9 in a ball, chiefly 14–17 μ in length.

ON IRIDACEAE:

Gladiolus sp. (cult.), Pennsylvania (Erie Co.); Saskatchewan.

TYPE LOCALITY: France, on *Gladiolus communis*.

DISTRIBUTION: Pennsylvania; also in Europe and Japan.

ILLUSTRATIONS: Gard. Chron. II. 6: f. 84, f. 85 a, b.

57. *Urocystis occulta*.

Add the synonym: *Tubercinia occulta* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 12. 1922.

Add, under POACEAE:

Secale cereale, Idaho, Illinois, Indiana, Iowa, Michigan, Missouri, North Dakota, Pennsylvania, South Dakota, Tennessee, Wisconsin; Alberta, Manitoba, Ontario; Saskatchewan.

Add the illustrations: Beitr. Krypt. Schweiz 3²: f. 66; Arch. Nat. Land. Böhmen 15²: f. 22.

Add the exsiccati: Brenckle, Fungi Dak. 673.

57. Insert:

9a. *Urocystis Tritici* Körn. Hedwigia 16: 33. 1877.

Tubercinia Tritici Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 17. 1922.

Sori chiefly in the leaves (occasionally in the stem and rarely in the glumes), forming elongate striae, more or less merged and often involving most of the parenchyma, at first covered by epidermis and lead-colored but eventually rupturing and shedding the granular black spore-mass; spore-balls dark-reddish-brown, irregularly subspheric to oblong, composed of 1–3, rarely 4 or 5 spores, covered rather completely by a cortex of deeply tinted sterile cells (subspheric to oval, 6–12 μ long as applied to spores), chiefly 20–40 μ in length; spores dark-reddish-brown, irregularly ovoid to subspheric, apparently smooth, chiefly 12–18 μ , rarely 20 μ in length.

ON POACEAE:

Triticum aestivum (*T. vulgare*), Illinois, Kansas, Missouri.

TYPE LOCALITY: South Australia, on *Triticum vulgare*.

DISTRIBUTION: Illinois, Kansas, Missouri; also in Australia, Europe, and Asia.

ILLUSTRATIONS: McAlpine, Smuts Austr. pl. 4, 5c, 6a, 7, 51.

NOTE: This species is very close to *Urocystis occulta* and by some authors regarded as identical with it; the slight differences seem to be the more complete envelopment of the spores by the slender cells and the apparently somewhat large spores and spore-balls.

58. *Urocystis Agropyri*.

Add the synonyms: ? *Urocystis Bornmülleri* Magnus, Ber. Deuts. Bot. Ges. 30: 290, 1912. *Tubercinia Agropyri* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 15. 1922.

Add, under POACEAE:

**Agropyron pauciflorum* (*A. tenerum*), Utah.

Agropyron repens, Indiana, New Hampshire, New York, Pennsylvania; Quebec.

Agropyron spicatum (*A. divergens*), Oregon.

**Agropyron* sp., Missouri; Manitoba.

**Agrostis alba* (*A. palustris*), Wisconsin.

**Bromus marginatus*, Washington.

Elymus canadensis, Indiana, Mississippi, New Mexico, Utah.

**Elymus condensatus*, Washington, Wyoming.

**Elymus glaucus*, Colorado, Idaho.

Elymus mollis (*E. arenarius*), Washington.

**Elymus striatus*, Missouri, Oklahoma.

Elymus virginicus, Indiana.

Elymus sp., Arkansas, New York, Pennsylvania, Tennessee, West Virginia; Alberta.

**Festuca Kingii* (*F. confinis*), Utah.

**Festuca rubra*, California.

**Glyceria striata* (*G. nervata*, *Panicularia nervata*), New York.

**Hordeum nodosum*, Oregon.

**Koeleria cristata*, Arizona.

**Melica imperfecta*, California.

**Poa pratensis*, Iowa, Pennsylvania.

Add the illustration: Beitr. Krypt. Schweiz 3²: 134. f. 67.

Add the note: On *Melica imperfecta* the number of spores in the balls is more frequently 3 or rarely 4 and the spore-balls are correspondingly larger, but it is doubtful if these variations merit specific distinction, as was recognized by Magnus for *U. Bornmülleri* on *M. Cupani* from Syria.

58. Insert:

10a. **Urocystis Fischeri** Körn. Hedwigia 16. 34. 1877.

Urocystis Agropyri Fisch. de Waldh. Bull. Soc. Nat. Mosc. 40¹: 258. 1867.

Tuburcinia Fischeri Liro, Ann. Univ. Fenn. Aboen. 1¹: 29. 1922.

Sori chiefly on leaves, rarely on culms, forming more or less elongate striae of embedded dark-colored spore-balls; spore-balls completely covered with thin lighter-colored sterile cells smaller than the spores, chiefly 20–40 μ in length; spores 1–3 (usually 1, rarely 3) in a ball, dark-reddish-brown, subspheric to irregularly elongate, 14–20 μ in length.

ON CYPERACEAE:

Carex atherodes, Manitoba.

Carex triquetra, California.

TYPE LOCALITY: Germany, on *Carex acuta*.

DISTRIBUTION: California; Manitoba; also in Europe.

ILLUSTRATION: Beitr. Krypt. Schweiz 3²: f. 67.

EXSICCATI: Rab. Fungi Eur. 4105; Vesterg. Micr. Rar. Sel. 189.

58. **Urocystis Junci**.

Add the synonym: *Tuburcinia Junci* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 33. 1922.

Insert: ILLUSTRATION: Beitr. Krypt. Schweiz 3²: f. 68.

58. **Urocystis granulosa**.

Add the synonym: *Tuburcinia granulosa* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 25. 1922.

58. Insert:

12a. **Urocystis Fraserii** Clinton & Zundel, sp. nov.

Sori in the upper parts of the stems, involving the inflorescence, chiefly the rachis, surrounding the whole stem or running out in narrow lines, first covered by a thin epidermis through which the granular black spore-mass can be seen; spore-balls opaque, tightly and apparently very permanently compacted, subspheric to oblong, chiefly 35–75 μ in length; sterile cells not very evident, tightly investing the spore-balls, rather indefinite even under pressure, lighter-colored and considerably smaller than the spores; spores dark-reddish-brown, not easily separated under pressure, chiefly irregular through pressure, smooth, but often with sterile cells or fragments adhering, 6–20, chiefly 10–15, in a ball, 16–23 μ in length. (See page 1029.)

ON POACEAE:

Stipa comata, Saskatchewan.

Type collected at Saskatoon, Saskatchewan, on *Stipa comata*, by W. B. Fraser and J. W. Scannell, June 5, 1922 (herb. U. S. Dept. Agr.).

DISTRIBUTION: Saskatchewan.

NOTE: Determined by the collectors as *Urocystis granulosa* Clinton, but, while apparently on the same host, decidedly different microscopically in that the spore-balls are more opaque, larger, and with a greater number of larger spores; the envelope of sterile cells is also much less distinctly made out.

59 **Urocystis Hypoxyis**.

Add the synonym: *Tuburcinia Hypoxyis* Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 39–40. 1922.

Add, under AMARYLLIDACEAE:

**Hypoxis domingensis*, Santo Domingo.

59. Insert:

13a. **Urocystis Giliae** Speg. Ann. Mus. Nac. Buenos Aires III. 12: 294. 1909.

Tuburcinia Giliae Liro, Ann. Univ. Fenn. Aboen. A. 1¹: 101. 1922.

Sori forming conspicuous, usually ellipsoid nodules, about 7-15 mm. long, on roots, at first firm and whitish, then grayish and finally showing black subgranular contents; spore-balls reddish-brown, subopaque to opaque, irregular, oblong to subspheric, chiefly 30-45 μ , occasionally 27-60 μ in length; sterile cells rather incompletely and closely but obscurely covering fertile cells, dark-reddish-brown, usually rather thick-walled, subspheric and frequently flattened, 8-15 μ in length; spores chiefly 1-3 or rarely more in a ball, ovoid to subspheric, difficult to separate from cortex-cells, 16-20 μ in length.

ON POLEMONIACEAE:

Gilia sp., Wyoming.

TYPE LOCALITY: Puerto del Inca, Argentina, on *Gilia foetida*.

DISTRIBUTION: Wyoming; also in Argentina.

NOTE: This is the first report of this smut in North America. It was collected at Lander, Wyoming, by J. P. Bennett and communicated to us by J. J. Davis. It differs from *Urocystis coralloides* Rostrup, the only other *Urocystis* on roots reported in America, by having darker-colored sterile cells and a quite different host.

13b. *Urocystis coralloides* Rostr. Bot. Centr. 5: 126. 1881.

Urocystis Sophiae D. Griff. Bull. Torrey Club 34: 209. 1907.

Sori occurring chiefly as wart-like tubercles on the upper portion of the roots, usually about 2 cm. below the surface of the ground, irregular, consisting of spore-balls finely packed together, 1 mm. to 1 cm. or sometimes larger; spore-balls subspheric, somewhat irregular, chiefly with 1-3 or sometimes 4 spores completely surrounded by yellowish-tinted sterile cells, chiefly 30-40 μ in diameter; spores spheric to subspheric, often flattened due to compression, dark-reddish-brown, smooth, 15-17 μ in diameter.

ON CRUCIFERACEAE:

Descurainaea andrenarum, Arizona.

TYPE LOCALITY: Denmark, on *Turrilis glabra*.

DISTRIBUTION: Arizona; also in Denmark.

60. *Entyloma lineatum*.

Add the synonym: *Entyloma Oryzae* Sydow, Ann. Myc. 12: 197. 1914. (Type from Philippine Islands, on *Oryza sativa*.)

Add, under POACEAE:

**Oryza sativa*, Louisiana.

Zizania aquatica, Delaware, District of Columbia, Indiana, Michigan, Minnesota, New Jersey.

60. *Entyloma crastophilum*.

Add the synonym: *Entyloma Calabrosae* Johans. Oefv. Sv. Vet.-Akad. Förh. 41^o: 160. 1885.

Add, under POACEAE:

**Glyceria pallida*, Wisconsin.

**Muhlenbergia asperifolia* (*Sporobolus asperifolius*), Utah.

**Muhlenbergia mexicana*, Indiana.

Add the note: Ciferri (Ann. Myc. 26: 20. 1928) gives *Entyloma Brefeldii* with *Entyloma crastophilum* on *Holcus lanatus* as a synonym of a new species which he calls *Entyloma Sydowianum* Cif. *Entyloma Brefeldii* was described by Krieger (Hedwigia 35: (145) 1896) on *Phalaris arundinacea*. Sydow issued several specimens in his exsiccati under this name, but on *Holcus lanatus*, one of which (Rab. Fungi Eur. 4202) was sent to him by Krieger. This fungus makes no spots that can be seen in the old dried leaves, and the spores are chiefly spheric and hyaline to light-yellow, so that to us it seems to be quite different from the species with darker-colored and often angular spores that makes distinct black spots on the leaves produced by *Entyloma crastophilum*.

60. *Entyloma irregulare*.

Add, under POACEAE:

Poa protensis, Michigan, Pennsylvania.

60. *Entyloma speciosum*.

Add, under POACEAE:

Panicum dichotomiflorum (*P. proliferum*), Indiana, Louisiana, Maryland.
 **Sporobolus argutus*, Santo Domingo.

Add the exsiccati: Ciferri, Myc. Doming. Exs. 96 (erroneously issued as *Tolyposporella Sporoboli* (Ellis & Ev.) Jackson).

61. Insert:

5a. *Entyloma parvum* Davis, Trans. Wis. Acad. 19: 715. 1919.

Sori in the culms, black, linear, appearing as small fusiform galls, which dehisce as longitudinal fissures, 0.5–1 mm. in length; spores yellowish-brown, packed and rather firmly agglutinated, ovoid to subspheric or somewhat angular due to compression, smooth, with moderately thick walls, chiefly 7–10 μ in diameter.

ON CYPERACEAE:

**Eleocharis acicularis*, Massachusetts, Wisconsin.TYPE LOCALITY: Plover, Wisconsin, on *Eleocharis acicularis*.

DISTRIBUTION: Massachusetts and Wisconsin.

61. *Entyloma Thalictri*.

Add, under RANUNCULACEAE:

Thalictrum dasycarpum*, Wisconsin.*Thalictrum dioicum*, Indiana; Manitoba.*Thalictrum polygamum*, New Hampshire.Thalictrum* sp., New York.61. *Entyloma Ranunculi*.

Add, under RANUNCULACEAE:

Ranunculus Bongardi*, Colorado, Oregon.Ranunculus delphinifolius*, Indiana.**Ranunculus Macounii*, Manitoba.**Ranunculus septentrionalis*, Maine.Add the illustration: Beitr. Krypt. Schweiz 3²: f. 59.

61. Insert:

7a. *Entyloma Meliloti* McAlpine, Smuts Austr. 195. 1910.

Sori in the leaves, ovate, somewhat pustulate at margin, 0.5–1 mm. in diameter, but often confluent and then larger, with a light-colored center and a darker-colored margin, showing on both surfaces of the leaves; spores hyaline to yellowish or golden, chiefly subspheric, sometimes slightly angled through pressure, with a moderately thick epispore, chiefly 10–14 μ in diameter; conidia frequent, showing on the under side of the leaf as whitish growth, hyaline, cylindrical, slightly bent, 2–2.5 \times 28–32 μ .

ON LEGUMINOSAE:

Melilotus indica, Alabama, Louisiana; Bermuda.TYPE LOCALITY: Werribee, Victoria, Australia, on *Melilotus indica*.

DISTRIBUTION: Alabama; Bermuda; also in Australia.

ILLUSTRATION: McAlpine, Smuts Austr. pl. 56, f. 226.

61. *Entyloma Menispermii*.

Add, under MENISPERMACEAE:

Menispermum canadense, Indiana, Ohio, Pennsylvania, South Dakota, West Virginia;
 Alberta, Manitoba, Ontario.

62. *Entyloma compositarum*.

Add the synonyms: *Entyloma incertum* Ciferri, Ann. Myc. 26: 38. 1928. (On *Bidens chrysanthemoides*.) *Entyloma Eupatorii* Ciferri, Ann. Myc. 26: 38. 1928. (On *Eupatorium urticaefolium*.) *Entyloma wisconsinense* Ciferri, Ann. Myc. 26: 40. 1928. (On

Senecio aureus.) *Entyloma Helenii* Ciferri, Ann. Myc. 26: 40. 1928. (On *Helenium autumnale*.) *Entyloma lepachydis* Ciferri, Ann. Myc. 26: 41. 1928. (On *Lepachys pinnata*.) *Entyloma anceps* Ciferri, Ann. Myc. 26: 44. 1928. (On *Rudbeckia laciniata*.) *Entyloma Boltoniae* Ciferri, Ann. Myc. 26: 47. 1928. (On *Boltonia asteroides*.) *Entyloma Madiae* Ciferri, Atti Ist. Bot. Pavia III. 1: 88. 1924. (On *Madia glomerata*.)

Add, under AMBROSIACEAE:

Ambrosia artemisiifolia, Indiana, New York, Pennsylvania, South Dakota; Ontario.
Ambrosia trifida, Colorado, Connecticut, Delaware, Maryland, New York, North Dakota, Pennsylvania; Alberta, Manitoba, Ontario.

Add, under CARDUACEAE:

**Aster adscendens*, Wyoming.
Aster sp., Pennsylvania; Manitoba.
Bidens laevis (*B. chrysanthemoides*), Wisconsin.
**Bidens tenuisecta*, New Mexico.
**Bidens vulgata*, Wisconsin.
**Bidens* sp., New Brunswick, Nova Scotia.
**Boltonia asteroides*, Wisconsin.
**Chrysopsis asprella* (*C. arida*), Colorado.
**Chrysopsis villosa*, Colorado.
**Erigeron Coulteri*, Utah.
**Erigeron glabellus*, Colorado.
**Erigeron macranthus*, Colorado.
Erigeron salsuginosus, Wyoming.
**Erigeron subtrinervis*, Colorado.
Eupatorium urticaefolium (*E. ageratoides*), Mississippi, West Virginia, Wisconsin.
Lepachys pinnata (*Ratibida pinnata*), Kansas.
**Madia glomerata*, North Dakota.
**Madia* sp., Oregon.
Rudbeckia laciniata, Illinois, Iowa, Wisconsin.
Senecio aureus, Indiana, Kansas, Pennsylvania.
**Senecio Fendleri*, Colorado.
**Senecio Robbinsii*, New York.

Add, under CICHORIACEAE:

**Agoseris* sp., Manitoba.

Add the exsiccati: Brenckle, Fungi Dak. 582, 1009; Barth, Fungi Columb. 3223, 3319, 5014; Seym. & Earle, Econ. Fungi 292a, 292b, 294b.

62. Insert:

9a. *Entyloma Achilleae* Magnus, Abh. Nat. Ges. Nürnberg 13: 8. 1900.

Sori on the linear divisions of the leaves, rather indefinite, causing premature withering; spores scattered sparsely through the tissues, hyaline to light-yellow, subspheric to spheric, with evenly and moderately thick walls, 10–15 μ in diameter; conidia forming aerial tufts, chiefly fusiform, about 2–3 μ thick in the middle and tapering to one or both ends, often somewhat curved, 10–16 μ in length.

ON CARDUACEAE:

Achillea Millefolium, Manitoba.

TYPE LOCALITY: Germany, on *Achillea Millefolium*.

DISTRIBUTION: Canada; also in Europe.

NOTE: Spores very similar to those of *E. compositarum*; species doubtfully distinct.

62. *Entyloma polysporum*.

Add the synonym: *Entyloma Davisi* Ciferri, Ann. Myc. 26: 43. 1928. (On *Rudbeckia hirta*.)

Add, under AMBROSIACEAE:

Ambrosia artemisiifolia, New Hampshire.

Ambrosia trifida, Colorado, Indiana, Wisconsin.

Add, under CARDUACEAE:

**Gaillardia aristata*, Colorado; Manitoba.

Gaillardia pulchella, Nebraska.

**Gaillardia* sp., Minnesota.

**Helenium autumnale*, Montana.

**Lepachys columnifera* (*Ratibida columnaris*), South Dakota. (Reported in Brenckle, Fungi Dak. 661 as *E. compositarum*.)

**Rudbeckia hirta*, Wisconsin; Ontario.

Add the exsiccati: Barth. Fungi Columb. 3424, 4820, 4917; Sydow, Ust. 416; Brenckle, Fungi Dak. 661.

Add the note: On *Helenium* and *Lepachys* the spores are somewhat smaller than usual.

63. Insert:

11a. *Entyloma Dahliae* Sydow, Ann. Myc. 10: 36. 1912.

Sori in leaves, with definite margin, subcircular to elliptic, somewhat irregular, dark-brown, showing on both surfaces of the leaf, 3–12 mm. in length; spores chiefly light-yellow, spheric to subspheric, thick-walled, smooth, 9–14 μ in diameter; conidia not reported.

ON CARDUACEAE:

Dahlia coccinea, Guatemala.

Dahlia variabilis, New Jersey.

Dahlia sp., Guatemala.

TYPE LOCALITY: Harden Heights, Natal, Union of South Africa, on *Dahlia variabilis*.

DISTRIBUTION: New Jersey; Guatemala; also in South Africa and Europe.

ILLUSTRATIONS: Gard. Chron. III. 84: 393; Jour. Royal Hort. Soc. 57: f. 115–118.

11b. *Entyloma Calendulae* (Oud.) DeBary, Bot. Zeit. 32: 105. 1874.

Protomyces Calendulae Oud. Arch. Neerl. 8: 384. 1873.

Protomyces Hieracii Berk.; Cooke, Grevillea 12: 99, as synonym. 1884.

Entyloma Erigerontis Sydow, Ann. Myc. 16: 244; hyponym. 1919.

Sori in leaves forming rather definite greenish-yellow to dark-brown subcircular spots, often with a limiting darker ring, more or less thickened, showing on both surfaces, up to 5–6 mm. in diameter; spores yellowish or old specimens occasionally darker-colored, massed rather firmly together, with medium-thick to thick double walls which may show signs of a gelatinous hyphal filament at one side, subcircular to somewhat angular through pressure, chiefly 10–16 μ in diameter.

ON CARDUACEAE:

Calendula officinalis, New York.

TYPE LOCALITY: Utrecht, Holland, on *Calendula officinalis*.

DISTRIBUTION: New York; also in Europe.

ILLUSTRATIONS: Beitr. Krypt. Schweiz 3²: f. 58; Arch. Nat. Land. Böhmen 15²: f. 21.

NOTE: It is very doubtful if *E. polysporum*, *E. Holwayi*, and *E. arnicale* are distinct from this species. All are large-spored forms with double often thick spore-walls, in contrast with the thinner-walled spores of *E. compositarum*; however, they are maintained until further studies can be made.

11c. *Entyloma Circaeae* Dearness, sp. nov.

Sori on the leaves, angular, at first yellowish below but eventually reddish-brown on both sides, chiefly 1–4 mm. in diameter; spores in densely agglutinated masses and not easily separated under pressure without injury, when mature showing reddish-brown in mass, ovoid to chiefly subspheric or spheric, thick-walled and often with indications of hyaline papillae, but the outer wall may be broken by pressure and then the spores appear smooth and lighter-colored, 10–16 μ long. (See page 1030.)

ON ONAGRACEAE:

Circaea alpina, Oregon.

Type collected in Mt. Hood National Forest, Oregon, on *Circaea alpina*.

DISTRIBUTION: Known only from the type locality.

NOTE: This agrees fairly well with *E. Chrysosplenii* as we have seen it on *Chrysosplenium alternifolium* from Europe.

63. *Entyloma arnicale*.

Add, under CARDUACEAE:

Arnica cordifolia, Colorado, Montana (collected by Kelsey and used as type for *Ramularia arnicale* Ellis & Ev.; Sacc. Syll. Fung. 10: 557. 1892), Wyoming.

**Arnica fulgens*, Colorado.

**Arnica subplumosa*, Colorado, Utah.

Add the exsiccati: Barth. Fungi Columb. 2368.

63. *Entyloma guaranicum*.

Add, under CARDUACEAE:

**Bidens pilosa*, Santo Domingo; Puerto Rico.

63. *Entyloma Floerkeae*.

Add, under LIMNANTHACEAE:

Floerkea proserpinacoides, Delaware, Indiana, New York, West Virginia.

63. Insert:

14a. *Entyloma bavaricum* Sydow, Ann. Myc. 22: 245. 1924.

Sori in the leaves, showing on both sides, oval to circular, thin, 3-5 mm. in length, at first light-yellow but the center later becoming deep-reddish-brown; spores rather firmly united, hyaline to light-yellow, regular, spheric or subspheric or sometimes angular by compression, with a wall about 1.5 to 2 μ thick, smooth, 9-12 μ in length or longer when compressed; conidia not observed.

ON CARDUACEAE:

Senecio pauciflorus, Washington.

TYPE LOCALITY: Bavarian Forest near Eisenstein, Bavaria, on *Senecio rivularis*.

DISTRIBUTION: Washington; also in Bavaria.

NOTE: This is the first report of this species in North America. It was collected by G. G. Hedcock in Blewett Pass, Washington, August 1, 1934, and communicated by J. Dearness. It is closely related to *Entyloma Bellidis* Krieger and *Entyloma Saccardianum* Scalia. Dearness reports hypophyllous conidia present.

14b. *Entyloma Agoseridis* Zundel, sp. nov.

Sori in the leaves, whitish, showing on both sides, circular with a very distinct margin, but sometimes coalescing, regular, 3-4 mm. in diameter, thin; spores hyaline or tinted yellow, chiefly spheric to subspheric, sometimes ellipsoid, occasionally angular by compression, with moderately thin cell-wall (not more than 1 μ), chiefly 9-12 μ in length; conidia not observed. (See page 1030.)

ON CICHORIACEAE:

Agoseris purpurea (*Troximon purpureum*), Colorado.

Type collected in *Agoseris purpurea*, by L. O. Overholts & L. T. Dennison, above Eldora, Colorado, at an altitude of 3000 meters, July 31, 1926. (Overholts Herbarium 16916.)

63. *Entyloma Collinsiae*.

Add, under SCROPHULARIACEAE:

**Collinsia grandiflora*, Oregon.

**Collinsia tenella*, Oregon.

64. *Entyloma Lobeliae*.

Add, under LOBELIACEAE:

**Lobelia Cliffortiana*, Santo Domingo; Puerto Rico.

Lobelia inflata, Indiana, New York, Pennsylvania, Vermont, West Virginia.

**Lobelia spicata*, Pennsylvania.

64. *Entyloma australe*.

Add, under SOLANACEAE:

Physalis heterophylla, Pennsylvania; Ontario.

Physalis lanceolata, Manitoba.

Physalis longifolia, Colorado, Nebraska.

**Physalis neomexicana*, New Mexico.

**Physalis pruinosa*, New York.

Physalis pubescens, Iowa, Missouri, Virginia; Puerto Rico.

**Physalis rotundata*, Colorado.

Physalis subglabrata (*P. philadelphica*), Illinois, New York, Pennsylvania.

- **Physalis turbinata*, Santo Domingo.
Physalis virginiana, North Dakota.
 **Physalis viscosa*, Florida.
Physalis sp., Arkansas, West Virginia.
 **Quincula lobata*, Colorado.
Solanum triflorum, Colorado, New Mexico; Manitoba.

Add the exsiccati: Barth. Fungi Columb. 3520, 4019; Rab. Fungi Eur. 4402; Brenckle, Fungi Dak. 528.

64. *Entyloma serotinum*.

Add, under BORAGINACEAE:

- **Lappula floribunda*, Utah.
Mertensia virginica, District of Columbia, Virginia.

Add the note: Conidia were present on both of the above hosts (see page 64).

64. *Entyloma Saniculae*.

Add, under AMMIACEAE:

- **Sanicula canadensis*, New York.
 **Sanicula gregaria*, Wisconsin.
Sanicula marylandica, Maryland.
Sanicula sp., Oregon.

65. *Entyloma Linariae*.

Add, under SCROPHULARIACEAE:

- Linaria vulgaris*, Illinois, New York, Pennsylvania.

65. Insert:

- 21a. *Entyloma Veronicae* (Wint.) Lagerh.; Pat. & Lagerh. Bull. Soc. Myc. Fr. 7: 170. 1891.

Entyloma Linariae var. *Veronicae* Wint.; Rab.-Wint. Fungi Eur. 3001. 1884.

Entyloma Linariae f. *Veronicae* Halsted, Bull. Torrey Club 17: 96. 1890.

Sori appearing as yellowish or whitish, well-defined spots on both surfaces of the leaves; spores deep-tinted, dark, 13-16 μ or the most elongate sometimes 19 μ in length; conidia described as 27-30 $\mu \times 2 \mu$.

ON SCROPHULARIACEAE:

- Veronica americana*, Colorado, New York.
Veronica peregrina, Connecticut, Illinois, Indiana, Iowa, Maryland, Mississippi, Missouri, Wisconsin.

TYPE LOCALITY: Perryville, Missouri, on leaves of *Veronica* sp.

DISTRIBUTION: Connecticut to Wisconsin and Colorado; also in Ecuador.

EXSICCATI: Rab.-Wint. Fungi Eur. 3001; Ellis, N. Am. Fungi 1487; Seym. & Earle, Econ.

Fungi C20.

NOTE 1: This was treated on page 65 as *Entyloma Linariae* var. *Veronicae*.

NOTE 2: Farlow (Bot. Gaz. 8: 275. 1883) reports *Entyloma Linariae* on *Veronica peregrina* from Wisconsin, collected by Trelease.

65. Insert:

- 21b. *Entyloma Clintonianum* Zundel & Dunlap, sp. nov.

Sori yellowish or reddish-brown, subcircular, showing on both surfaces of the leaf, about 1-2 mm. in diameter; spores spheric to subspheric, though occasionally somewhat flattened laterally by pressure, yellowish or very light-reddish-brown, with moderately thick cell-wall, chiefly 10-14 μ in diameter; conidia not observed. (See page 1030.)

ON SCROPHULARIACEAE:

- Mimulus floribundus*, Washington.

Type collected at Longmire Springs, Rainier National Park, Washington, on *Mimulus floribundus*, by C. V. Piper, June 28, 1895.

DISTRIBUTION: Rainier National Park.

NOTE: Clinton received this from Farlow and wrote most of the above description, without a specific name. He made the following observations, which were filed with the specimen: "I have not been able to find any *Entyloma* reported on *Mimulus*. *Linaria*, *Veronica*, and *Collinsia* are the only other genera of the *Scrophulariaceae* on which entylomas have been reported, unless recently. It seems to agree best with *E. Collinsiae*. It differs from *E. Linariae*

in the absence of double spore-walls and from *E. Linariae Veroniceae* and *E. veronicicola* (not yet reported in America but evidently very similar to the preceding species) in smaller, more regular spores, without double wall."

21c. *Entyloma Gratiolae* (Davis) Ciferri, Ann. Myc. 26: 42. Ja 1928.

Entyloma Linariae var. *Gratiolae* Davis, Trans. Wis. Acad. 21: 262. [Jl] 1924.

Sori in the leaves, showing on both sides, yellowish-white, subcircular, about 1 mm. in diameter; spores crowded, yellowish, with evident double wall, with epispore nearly smooth to usually distinctly verrucose, ovoid to chiefly subspheric or spheric, 13-18 μ in length; conidia not observed.

ON SCROPHULARIACEAE:
Gratiola virginiana, Wisconsin.
DISTRIBUTION: Wisconsin.

66. *Entyloma fuscum*.

Add, under PAPAVERACEAE:

- **Papaver Rhoeas*, Bermuda.
- **Papaver somniferum*, Bermuda.

Insert: ILLUSTRATION: Beitr. Krypt. Schweiz 3²: f. 57.

66. *Entyloma microsporum*.

Add, under RANUNCULACEAE:

Ranunculus septentrionalis, Indiana, Maine, New York.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 60.

66. *Entyloma Nymphaeae*.

Add, under NYMPHAEACEAE:

- Castalia odorata*, New York.
- Castalia tuberosa*, Ontario, Nova Scotia; Puerto Rico.
- Castalia* sp., District of Columbia, Indiana.
- Nymphaea advena* (*Nuphar advena*), Manitoba.

66. Add the doubtful species:

Entyloma Browalliae H. Sydow, Ann. Myc. 23: 326. 1925. Sori in the leaves, forming orbicular, yellowish or brownish spots, 2-4 mm. in diameter; spores globose to subglobose or angular, smooth, yellowish, 10-12 μ in diameter, the wall of uniform thickness, 2-3 μ . ON SOLANACEAE: *Browallia demissa*, Costa Rica. Specimens of this species were not available to us for study.

Entyloma bullulium Ciferri, Nuovo Giorn. Bot. Ital. 11. 40: 252. 1933. ON CARDUACEAE: *Sonchus oleraceus*, Santo Domingo. We have seen no specimen of this smut, whose spores are given as 10-14 μ in diameter. It is closely related to or identical with *E. compositarum*.

Entyloma costaricense Ciferri, Nuovo Giorn. Bot. Ital. 11. 40: 260. 1933. ON CARDUACEAE: *Viguiera silvatica*, Costa Rica. We have seen no specimens of this smut, whose spores are given as 10-11 μ in diameter, with a cell-wall about 1.5 μ thick. It is closely related to or identical with *E. compositarum*.

Entyloma Farisii Ciferri, Ann. Myc. 26: 11. 1928. ON POACEAE: *Tricholaena rosea*, Santo Domingo. We have seen no specimen of this species, whose spores are given as 9.5-14.5 μ . This is the only smut reported on *Tricholaena*, though *Entyloma speciosum* is recorded on *Panicum* sp., *Tricholaena* being considered by some writers as a synonym of *Panicum*.

Entyloma occultum Ciferri, Ann. Myc. 26: 10. 1928. ON CARDUACEAE: *Erigeron spathulatus*, Santo Domingo. We have seen no specimen of this species, whose spores are given as mostly 13-17 μ to 11-21 μ . Three other species of *Entyloma* have been reported on the genus *Erigeron*, but none of these are on this host-species.

Entyloma Polygoni-punctati Ciferri, Ann. Myc. 26: 11. 1928. ON POLYGONACEAE: *Persicaria punctata* (*Polygonum punctatum*), Santo Domingo; *Persicaria spectabilis* (*Polygonum spectabile*), Santo Domingo. We have seen no specimen of this species, whose spores are given as 6-8.5 μ , usually 7 μ . There is no other *Entyloma* reported on these species although seventeen or more smuts have been listed on *Polygonum*.

Entyloma Sidae-rhombifoliae Ciferri, Ann. Myc. 26: 11. 1928. ON MALVACEAE: *Sida rhombifolia*, Santo Domingo. We have seen no specimen of this *Entyloma*, which is apparently the only smut on this host-genus or its family. Ciferri gives the spores as 10.5-14.7 μ , or usually 11.5-13 μ .

67. *Burrillia decipiens*.

Add, under MENYANTHACEAE:

Limnanthemum lacunosum, New York; Ontario.

67. Insert:

1a. *Burrillia Limnanthemum* Ciferri, Ark. Bot. 23A¹⁴: 22. 1931.

Sori on the leaves, forming irregular, isolated, scattered, yellowish spots, 2-3 mm. in length; spore-balls with spores surrounding a central layer of subpolyhedral parenchymatous cells, $37-45 \mu \times 44-52 \mu$, light-yellowish-brown; spores elongate, subpolyhedral, light-yellowish, with a thick (2μ) smooth epispore, $15-19 \mu \times 4-6 \mu$.

ON MENYANTHACEAE:

Limnanthemum Humboldtianum, Santo Domingo.TYPE LOCALITY: Between Guerra and Cuenca, Llano Costero, Santo Domingo, on *Limnanthemum Humboldtianum*.

DISTRIBUTION: Santo Domingo.

NOTE: We have not seen a specimen of this species, but our description is based on that of Ciferri, who also states that it differs from *Burrillia decipiens* on the same host-genus in habit, in size and form of the spore-balls, and in size of spores and parenchymatous cells.67. *Burrillia Echinodori*.

Add, under ALISMACEAE:

Echinodorus cordifolius, Puerto Rico, Santo Domingo.

Add: EXSICCATI: Barth. Fungi Columb. 5002.

67. *Burrillia pustulata*.

Add, under ALISMACEAE:

Sagittaria latifolia (*S. variabilis*), Ontario.

Add the exsiccati: Sydow, Ust. 500.

67. Insert:

4. *Burrillia Acori* Dearness, sp. nov.

Sori causing discoloration of tissues but imbedded in lacunae within the leaf and revealed only upon splitting this open; spore-balls one or more in a lacuna, sometimes surrounded by whitish fluffy mycelium as if immature, elongate to subspherical, yellowish but probably darker with age, about $150-200 \mu$ in length; spores variable as if loosely arranged, smooth, yellowish, chiefly oval to subspherical, $10-15 \mu$ in length. (See page 1030.)

ON ARACEAE:

Acorus Calamus, Ontario.Type collected at pond near Hespeler, Wellington County, Ontario, on *Acorus Calamus*, by Dearness (no. 6306), August 2, 1913.

DISTRIBUTION: Known only from the type locality.

68. *Doassansia Epilobii*.

Add, under ONAGRACEAE:

**Epilobium* sp., Colorado.

68. Insert:

1a. *Doassansia Downingiae* Liro, Ann. Bot. Vanamo 6¹: 2. 1935.

Sori in leaves, amphigenous, forming small elongate violet-brown spots, with the spore-balls showing as minute papillae; other sori on stems, violet-brown; spore-balls with a distinct cortex and a spore-mass entirely filling the interior, irregularly spherical to cylindrical, $75-200 \mu$ in length; cortical cells yellowish-brown, irregularly spherical to polygonal or obovate, often only $3-5 \mu$ in diameter but sometimes up to 10μ in length,

the walls finely punctate, up to 2.5μ thick; spores yellowish, subspherical to polyhedral, $10-14 \mu$ in length, the wall about 1μ thick.

ON LOBELIACEAE:

Downingia elegans (*Bolelia elegans*), Idaho.

TYPE LOCALITY: Lake Coeur d'Alene, "Palouse" [Kootenai] County, Idaho, on *Downingia elegans*.

DISTRIBUTION: Known only from the type locality.

68. Insert:

1b. *Doassansia Callitriches* Jackson & Linder; Linder, *Mycologia* 30: 669. 1938.

Sori not clearly defined; spore-balls in the mesophyll of leaves or cortex of stems, scattered, prominent, dark-brown, globose or depressed-ellipsoid, $140-170 \mu$ in diameter; spores angularly subglobose, $11-14 \mu$, or ellipsoid, $9.5-13 \mu \times 12.5-16 \mu$, the walls thin, 1μ or less, colorless or slightly yellowish; cortical cells slightly larger than the spores but more irregular, the walls chestnut-brown, 1.5μ thick, finely and closely internally verrucose.

ON CALLITRICHAEAE:

Callitriche marginata var. *longipedunculata*, California.

TYPE LOCALITY: Puddingstone Dam, San José Hills, Los Angeles, California, on *Callitriche marginata* var. *longipedunculata*.

DISTRIBUTION: Southern California.

ILLUSTRATION: *Mycologia* 30: 670. f. 10.

68. *Doassansia ranunculina*.

Add, under RANUNCULACEAE:

Ranunculus delphinifolius, Maryland; Manitoba.

69. *Doassansia Sagittariae*.

Add, under ALISMACEAE:

**Lophotocarpus calycinus*, Wisconsin.

Sagittaria arifolia, Wisconsin, Wyoming; Saskatchewan.

Sagittaria latifolia (*S. variabilis*), Connecticut, Indiana, Montana, North Dakota; Manitoba.

Sagittaria rigida (*S. heterophylla*), Indiana.

Sagittaria sp., Arkansas, South Dakota.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 61.

Add the exsiccati: Barth. Fungi Columb. 4319; Brenckle, Fungi Dak. 253.

Doassansia Sagittariae var. *confluens* Davis, Trans. Wis. Acad. 14: 92. 1903. ON ALISMACEAE: *Sagittaria rigida* (*S. heterophylla*), Wisconsin. This differs from the species by the larger sori, which are frequently confluent.

69. *Doassansia Alismatis*.

Add, under ALISMACEAE:

Alisma Plantago-aquatica, Michigan, Montana, North Dakota; Manitoba, Ontario.

**Alisma subcordatum*, Manitoba.

Add the illustration: Beitr. Krypt. Schweiz 3²: f. 62.

Add the exsiccati: Brenckle, Fungi Dak. 202; Sydow, Ust. 461.

69. *Doassansia opaca*.

Add, under ALISMACEAE:

Sagittaria latifolia (*S. variabilis*), Indiana, Wisconsin.

70. *Doassansia occulta*.

Add, under ZANNICHELLIACEAE:

**Potamogeton epihydrus*, Maryland, New York.

70. Insert:

6a. *Doassansia furva* Davis, Trans. Wis. Acad. 19: 704. 1919.

Sori in the leaves, forming dark spots with evidence of the spore-balls as grouped pimples in the center; spore-balls in the parenchyma in a single layer or loosely clustered,

dark-brown, oval to spheric more irregular when clustered 100–150 μ in length; cortical cells inconspicuous, often flattened, 6–17 μ wide; spores in a single layer surrounding a central parenchyma, yellowish, ellipsoid to subspheric, or angled through pressure, 9–17 μ in length.

ON ALISMACEAE:

Sagittaria latifolia (*S. variabilis*), Manitoba.

Sagittaria rigida (*S. heterophylla*), Wisconsin.

TYPE LOCALITY: Arcadia, Wisconsin, on *Sagittaria heterophylla*.

DISTRIBUTION: Wisconsin and Manitoba.

70. *Doassansia Martianoffiana*.

Add, under ZANNICHELLIACEAE:

**Potamogeton epihydrus*, Ontario.

**Potamogeton heterophyllus*, Michigan; Manitoba.

Potamogeton natans, Maine; Manitoba, Ontario.

Add the exsiccati: Sydow, Ust. 464.

70. *Doassansia intermedia*.

Add, under ALISMACEAE:

Sagittaria arifolia, Saskatchewan.

Sagittaria latifolia (*S. variabilis*), Manitoba, Ontario.

71. *Doassansia deformans*.

Add, under ALISMACEAE:

Sagittaria latifolia (*S. variabilis*), Indiana, Iowa, Nebraska, New Jersey, New York; Manitoba, Ontario.

71. Add the excluded species:

Doassansia domingensis Ciferri, Ark. Bot. 23A¹⁴: 24. 1931. Sori in leaves, causing small, circular, amphigenous, yellowish, well-defined spots without borders, 1.5–2 mm. in diameter; spore-balls more or less regularly spheric to subelongate, with a double ring of spores surrounding a central body of parenchymatous cells, 140–160 μ in length; cortical cells yellowish, irregularly elliptic-elongate with rather thick walls (2–3 μ), 14–22 μ \times 3–8 μ ; parenchymatous subpolyhedral, subhyaline, 8–16 μ \times 12–14 μ ; spores light-brown to brownish-yellow, irregularly subcylindric with rounded ends, generally 7–10 μ \times 3–6 μ . ON ZANNICHELLIACEAE: *Potamogeton fuitans* var. *americanus*, Santo Domingo. ILLUSTRATIONS: Ark. Bot. 23A¹⁴: pl. 3, f. 8. We have not seen this species, but it differs apparently in the smaller spores and larger cortical cells, and according to Ciferri might be considered by some as a variety of *D. Martianoffiana* on the same host-genus.

Doassansia Eichhorniae Ciferri, Ann. Myc. 26: 11. 1928. ON PONTEDERIACEAE: *Eichhornia crassipes* (*E. speciosa*), Santo Domingo. We have seen no specimen of this *Doassansia* which is the only smut reported on this host-genus or its family. Ciferri gives the spore-balls as 180–200 μ and the spores as 12.5–18 μ in diameter.

Doassansia Limnocharidis Ciferri, Ark. Bot. 23A¹⁴: 23. 1931. Sori on leaves, causing more or less round, brown, confluent spots (dirty-white in center and here slightly inflated), with a tendency to form multiple rows parallel to the midrib, rarely toward the margin, 2–3 mm. in diameter; spore-balls in the spongy parenchyma, irregularly spheric to elliptic, with fertile cells generally in a single ring surrounding a parenchymatous center, 100–160 μ in length; cortical cells elongate, subhyaline, with rather thick walls (2–2.5 μ), 10–14 μ \times 3–8 μ ; parenchymatous cells irregularly polyhedral, subhyaline, 6–10 μ \times 3–5 μ ; spores firmly adherent elliptic to subelongate, yellowish-brown, with smooth thin epispore, normally 9–13 μ \times 4–6 μ . ON ALISMACEAE: *Limnocharis flava*, Santo Domingo. ILLUSTRATIONS: Ark. Bot. 23A¹⁴: pl. 3, f. 10. We have seen no specimen of this smut, but from Ciferri's description it differs from *Doassansia Alismatis* on the same host-family by being a *Doassanstopsis* instead of a *Eudoassansia*, and apparently has smaller cortical cells and spores.

71. *Tracya Lemnae*.

Add, under LEMNACEAE:

Spirodela polyrhiza, Manitoba.

LATIN DIAGNOSES OF NEW SPECIES

Ustilago Jacksonii Zundel & Dunlap. (Page 982.)

Soris in culmorum partibus superioribus inflorescentiam abortantibus; sporis saturate rubescenti-brunneis, ovoideis vel subglobosis, granuloverruculosis, saepius 9–12 μ longis.

Ustilago Alsineae Clinton & Zundel. (Page 991.)

Soris in ovulis, ovoideis vel ellipsoideis, circa 2–3 mm. longis, semina in massam pulverulentem purpureo-nigram mutantis; sporis atropurpureis, saepe subopacis, subglobosis, obscure minutissime sed non profunde reticulatis, saepius 10–14 μ crassis.

Sphacelotheca veracruziana Zundel & Dunlap. (Page 994.)

Soris ovaria complentibus, ovoideis, saepius 1–2 mm. latis, pseudomembrano crasso prominenti irregulariter dehiscenti tectis; sporarum massis pulverulentibus, nigro-brunneis, columellam magnam globosam circumstantibus; membrani cellulis sterilibus forma magnitudineque variabilibus, cohaerentibus, cellulis interioribus saepe binis, hyalinis, tunica crassa, angulatis, subglobosis, quam sporis minoribus; sporis moderate agglutinatis, rubescenti-brunneis, ovoideis vel ellipsoideis, grosse verruculosis, saepius 8–13 μ longis.

Sphacelotheca panamensis Zundel & Dunlap. (Page 995.)

Soris in ovariiis, quam glumis pauce brevioribus et in eis occultis, circa 3 mm. longis, linearibus, primo pseudomembrano tectis, dein sporarum massam pulverulentem, postremo columellam tenuiter acuminatam aperientibus; membrana sterile in cellulis subglobosis vel globosis facile separante, cellulis sporas subaequantibus; sporis rubescenti-brunneis, tunica tenui, subregularibus, saepius subglobosis, ut videtur levibus sed summa magnificatione olim minute granularibus, 14–18 μ crassis.

Cintractia Farlowii Clinton. (Page 1000.)

Soris in ovariiis, in glumis plus minus omnino occultis, 1–2 mm. latis; sporarum massa primo semiagglutinata sed postremo nigra, subpulverulenti; sporis pseudobicellularibus, saturate rubescenti-brunneis, saepius 10–12 μ longis.

Cintractia striata Clinton & Zundel. (Page 1004.)

C. leucodermati similis; soris culmicolis, 3–6 cm. longis; sporis magis regularibus et minus fragilibus, pallide rubescenti-brunneis, ovoideis vel saepius subglobosis, tunica moderate crassa, semispiraliter striatis, 14–18 μ crassis.

Tilletia Youngii Clinton & Zundel. (Page 1012.)

Soris in ovariiis, in glumis occultis, hospitis tela tectis, ellipticis set in apicem styloideum attenuatis, circa 2 mm. longis, etiam in nodis, plantas abortantibus, colore purpureo-rubris; cellulis sterilibus subglobosis, saepe in extremo papillosis, tunica moderata vel tenui, hyalinis, 10–15 μ crassis; sporis subglobosis, hyalinis vel pallide aurcis, saepe maturitate aureo-brunneis, prominenter spinose sed maturitate truncate tuberculatis, saepius 23–27 μ crassis.

Urocystis Erythronii Clinton. (Page 1015.)

Soris in foliis, ellipticis, parvis, 1–2 mm. longis sed plus minus confluentibus, ambitu bullas plumbeas sub epidermide facientibus; sporarum glomerulis ovoideis vel subglobosis, aterrime rubescenti-brunneis vel nigro-brunneis, subopacis, cortice permanenti, saepius 25–45 μ longis; sporis 1–5, saturate rubescenti-brunneis, saepius 15–18 μ crassis.

Urocystis Fraserii Clinton & Zundel. (Page 1018.)

Soris in culmi partibus superioribus, inflorescentiam implicantibus, primo epidermide tenui tectis; sporarum glomerulis opacis, compactis, subglobosis vel oblongis, saepius 35–75 μ

longis; cellulis sterilibus subinconspicuis, quam sporis pallidioribus et multo minoribus; sporis saturate rubescenti-brunneis, valde cohaerentibus, levibus, in glomerulo 6-20, saepius 10-15, 16-23 μ longis.

Entyloma Circaeae Dearness. (Page 1022.)

Soris in foliis, angularibus, primo subtus lutescentibus, demum ambitu rubescenti-brunneis, saepius 1-4 mm. latis; sporarum massis densis, maturitate rubescenti-brunneis; sporis ovoideis vel subglobosis, 10-16 μ longis, tunica crassa, saepe hyaline papillatis.

Entyloma Agoseridis Zundel. (Page 1023.)

Soris in foliis, albescens, ambitu evidentibus, circularibus, distincte marginatis, regularibus, levibus, 3-4 μ latis; sporis hyalinis vel flavescens, subglobosis vel ellipsoideis, saepius 9-12 μ longis, tunica tenui; conidiis non visis.

Entyloma Clintonianum Zundel & Dunlap. (Page 1024.)

Soris in foliis, ambitu evidentibus, flavescens vel rubescenti-brunneis, subcircularibus, circa 1-2 mm. latis; sporis globosis olim complanatoribus, flavescens vel pallidissime rubescenti-brunneis, tunica moderata, saepius 10-14 μ crassis; conidiis non visis.

Burrillia Acori Dearness. (Page 1026.)

Soris in foliorum lacunis profunde clausis; sporarum glomerulis in lacunis solitariis vel pluribus, clongatis vel subglobosis, flavescens vel forsan maturitate obscurioribus, circa 150-200 μ crassis; sporis variabilibus, levibus, flavescens, saepius ovalibus vel subglobosis, 10-15 μ longis.